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DEPARTMENT OF COMMERCE

BUREAU OF FOREIGN AND DOMESTIC COMMERCE

E. E. PRATT, Chief

MISCELLANEOUS SERIES—No. 33

# PORTS OF THE UNITED STATES

## REPORT ON TERMINAL FACILITIES, COMMERCE, PORT CHARGES, AND ADMINISTRATION AT SIXTY-EIGHT SELECTED PORTS

BY

GROSVENOR M. JONES

Commercial Agent

WASHINGTON

GOVERNMENT PRINTING OFFICE

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## LETTER OF SUBMITTAL.

DEPARTMENT OF COMMERCE,
BUREAU OF FOREIGN AND DOMESTIC COMMERCE,
*Washington, January 5, 1916.*

SIR: The Bureau of Foreign and Domestic Commerce submits herewith a report entitled "Ports of the United States." This report, which was prepared during the first nine months of 1915, contains detailed information concerning 68 of the leading ports of the country—those which had in the calendar year 1913 a water-borne commerce exceeding 1,000,000 short tons in volume or $30,000,000 in value.

The subjects covered for each port are character of waterways comprising the port, railroads and steamship lines serving the port, commerce of the port, extent and ownership of water front, character of terminals, type of wharf construction, port administration, and port charges.

In the main body of the report the data have been presented by ports rather than by subjects in order to give a complete and connected description of each port. In the summary, on the other hand, the data have been presented by subjects. Broad comparisons between ports are made in the summary, but detailed comparisons may be readily made from the main body of the text, since a uniform method of description is used throughout.

The report has been prepared by Commercial Agent Grosvenor M. Jones, who visited many of the selected ports. The data presented herewith are based not only upon the facts secured as a result of personal inspections but also upon data compiled from the annual and special reports of the Chief of Engineers, United States Army, from the publications of the Coast and Geodetic Survey, and from special studies made by local harbor commissions. Information was secured also by correspondence. The Bureau records its appreciation of the effective cooperation of the Corps of Engineers of the United States Army, through its chief and the several district engineers, and of city officials, business men, and commercial organizations in the several cities covered in this report.

Respectfully,

E. E. PRATT,
*Chief of Bureau.*

To HON. WILLIAM C. REDFIELD,
*Secretary of Commerce.*

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# PORTS OF THE UNITED STATES.

## INTRODUCTION.

The Bureau of Foreign and Domestic Commerce presents herewith its first report on the ports of the United States. The only similar official report on this subject is contained in Part III of the Report on Transportation by Water in the United States, which was issued by the Bureau of Corporations in 1910. Many important changes have occurred since 1910 and consequently much of the data contained in the report prepared by the Bureau of Corporations has become more or less obsolete. The purpose of the present report is to supply the latest available information regarding the principal ports of the country.

The need of this information was emphasized by a resolution adopted by the American Association of Port Authorities [a] at its second annual convention, which was held in New Orleans in September, 1913. The resolution requested the Secretary of Commerce—

> To collect, compile, and disseminate information showing the character of ownership and administration of terminal and other facilities in the United States and their possessions; a description of the physical equipment of the same; the charges on goods and vessels, if any; the regulations governing the use of port facilities; and such other information as the Secretary of Commerce may deem useful.

During the last five years the country has witnessed a remarkable development of ports. The recent commercial development of the country, the building of the Panama Canal, together with the possibilities suggested by the change in trade routes it might cause, and the increasing tendency on the part of Congress to require communities receiving Federal appropriations for river and harbor work to cooperate in making the improvement or to provide public terminals—these and other factors have greatly stimulated the development of ports and port facilities.

Without doubt the investigations made by the Bureau of Corporations, which disclosed the fact that comparatively few ports had publicly-owned terminals, have had an important influence in formulating the present policy of Congress, as shown in rivers and harbors appropriation bills, and also in preparing the cities of the country for a ready acceptance of this policy.

**Methods of investigation.**—An extensive field investigation of the port facilities of the country would have required the employment of a large staff of experts for a considerable period of time. Funds adequate for such an investigation were not available. In view, moreover, of the large amount of data at hand in the annual and special reports of the Chief of Engineers of the United States Army and in the reports of harbor boards and special harbor commissions, an extensive field investigation was deemed unnecessary.

[a] The association was then known as the National Association of Port Administration.



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A schedule containing numerous inquiries was prepared and copies were mailed to the mayors of 576 cities. A copy of the schedule appears in Appendix A of this report. The responses were disappointing, since less than 50 schedules were returned properly filled out.

**Ports included in the report.**—On account of the unsatisfactory results of the schedule method as well as the lack of adequate funds and time, it became necessary to limit the scope of the investigation. After careful consideration it was decided to include only those ports that had a water-borne commerce amounting to 1,000,000 short tons in volume or $30,000,000 in value in the calendar year 1913, the latest period for which commercial statistics had been published in the annual reports of the Chief of Engineers of the United States Army at the time this inquiry was undertaken.[a] This line of demarcation unfortunately excludes a number of the smaller ports that are undertaking important harbor improvements. On the other hand it includes a number of ports to which attention is seldom directed.

The following is a list of the selected ports:

ATLANTIC COAST.

*Baltimore, Md.
*Boston, Mass.
*Bridgeport, Conn.
Brunswick, Ga.
Cape Charles, Va.
*Charleston, S. C.
*Fall River, Mass.
Hartford, Conn.
*Jacksonville, Fla.
*New Bedford, Mass.
*New Haven, Conn.
*New London, Conn.
*Newport News, Va.
*New York, N. Y.
*Norfolk, Va.
*Philadelphia, Pa.
*Portland, Me.
*Providence, R. I.
*Richmond, Va.
*Savannah, Ga.
*Washington, D. C.
Wilmington, Del.
*Wilmington, N. C.

GULF OF MEXICO.

*Galveston, Tex.
*Houston, Tex.
*Mobile, Ala.
*New Orleans, La.
*Pensacola, Fla.
*Port Arthur, Tex.
*Tampa, Fla.
*Texas City, Tex.

PACIFIC COAST.

Los Angeles, Cal.
Oakland, Cal.
Portland, Oreg.

PACIFIC COAST—continued.

Port San Luis, Cal.
Sacramento, Cal.
San Diego, Cal.
San Francisco, Cal.
Seattle, Wash.
Stockton, Cal.
Tacoma, Wash.

GREAT LAKES.

Ashland, Wis.
*Ashtabula, Ohio.
*Buffalo, N. Y.
*Charlotte (Rochester), N. Y.
*Chicago, Ill.
*Cleveland, Ohio.
*Conneaut, Ohio.
*Detroit, Mich.
Duluth-Superior, Minn., Wis.
*Erie, Pa.
Escanaba, Mich.
Fairport, Ohio.
Grand Haven, Mich.
Huron, Ohio.
Lorain, Ohio.
Ludington, Mich.
Manitowoc, Wis.
Marquette, Mich.
Milwaukee, Wis.
Ogdensburg, N. Y.
Sandusky, Ohio.
*South Chicago, Ill.
*Toledo, Ohio.
Tonawanda, N. Y.
Two Harbors, Minn.

OHIO RIVER.

*Cincinnati, Ohio.
*Pittsburgh, Pa.

[a] Recently (December, 1915) the data for the calendar year 1914 have been published by the Chief of Engineers and these have been inserted in this report merely to bring the statistics more nearly down to date. Because of the war in Europe, the data for 1914 are not truly representative and have not been used in the discussion of the commerce of the several ports.

* Visited by the author of the report.

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No attempt has been made in this report to classify ports according to their relative rank. They have been considered in alphabetical order under each principal geographical division.

The agent of the Bureau in his visits to the several cities received the hearty cooperation of the district Engineer officers of the United States Army, the secretaries of commercial organizations, city officials, and business men. These visits made it possible to secure not only fundamental facts but also expert opinions as to the advisability of improvements, forms of port administration, etc.

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## SUMMARY OF RESULTS.

A detailed description of each of the selected ports is given in the body of this report. Each description follows a uniform list and sequence of subjects. This method of presentation has been adopted in order that comparisons between ports may be made readily for any subject. It is therefore unnecessary to make an extended summary.

**General characteristics of selected ports.**—Of the 68 selected ports, 23 are on the Atlantic coast, 8 on the Gulf of Mexico, 10 on the Pacific coast, 25 on the Great Lakes, and 2 on the Mississippi River system or, to be more definite, on the Ohio River.

The great majority of the ports along the seaboard are actually located on rivers, some of the most important ports reached by ocean-going vessels being located far inland. Thus, New Orleans is 106 miles from the Gulf of Mexico; Philadelphia, 105 miles from Delaware Bay; Baltimore, 151 miles from Hampton Roads. Other ports located a considerable distance inland are Brunswick, which is about 13 miles from the ocean; Hartford, about 52 miles; Houston, 50 miles; Jacksonville, 27½ miles; Mobile, 30 miles; Port Arthur, Tex., about 17 miles; Portland, Oreg., 112 miles; Richmond, 104 miles; Sacramento, 111 miles; Savannah, 26 miles; Washington, 195 miles; Wilmington, Del., 82 miles; Wilmington, N. C., 30 miles. The ports of Houston and Port Arthur, it might be noted, are located on canals.

A considerable number of ports are located close to the ocean. A list of these ports includes Boston, Cape Charles, Charleston, Galveston, Los Angeles, Newport News, New York, Norfolk, Oakland, Pensacola, Portland, Me., Port San Luis, San Francisco, Seattle, Tacoma, and Texas City.

*Depth of channel.*—Four ports in the United States have entrance or main channels with a minimum depth at mean low water of 40 feet or more. These are New York, which has a dredged channel 40 feet deep; San Francisco, with a natural entrance channel 60 feet deep and depths of from 30 to 60 feet generally within the harbor; and Seattle and Tacoma, whose harbors are reported by the United States Coast and Geodetic Survey to be "very deep, usually too deep for anchorage except close to the shore."

A vessel with the draft of the *Aquitania* or the *Imperator* can proceed to the wharves of the above-named ports at any stage of the tide and to the wharves at the port of Boston at high tide. If not fully loaded, vessels of this size could probably dock at high tide at the ports of Portland, Me., Newport News, and Norfolk. When the channel in the Delaware River as far as Philadelphia has been dredged to a depth of 35 feet at mean low water, the largest vessels will be able to proceed to that port also at high tide.

Channels with a minimum depth of 35 feet at mean low water are to be found at the ports of Baltimore, Boston, Newport News, and Norfolk. Six ports, namely, Galveston, Los Angeles, New Orleans,



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Pensacola, Philadelphia, and Portland, Me., have 30 or 31 foot channels. A channel 35 feet deep is being dredged at the port of Philadelphia and channels 30 feet in depth at the ports of Portland, Oreg., and Providence.

Vessels with a draft of not more than 31 or 32 feet can enter the jettied channel at the mouth of the Mississippi River but the depth of the river from a point just inside of the jetties to the city of New Orleans is deep enough for any draft of vessel now afloat.

The controlling or minimum depth at mean low water of the entrance and harbor channels at each of the selected ports on the seaboard on June 30, 1914, as reported by the Chief of Engineers, United States Army, together with the mean range of tide and the maximum usable depth at high tide of the entire channel are shown in the following table:

| Ports. | Minimum depth. | Mean range of tide.[a] | Maximum depth. |
|---|---|---|---|
| NORTH ATLANTIC. | *Feet.* | *Feet.* | *Feet.* |
| Boston, Mass | 35.00 | 9.50 | 44.50 |
| Bridgeport, Conn | 22.00 | 6.50 | 28.50 |
| Fall River, Mass | 22.00 | 4.75 | 26.75 |
| Hartford, Conn | 12.00 | 1.00 | 13.00 |
| New Bedford, Mass | 25.00 | 4.25 | 29.25 |
| New Haven, Conn | 20.00 | 6.00 | 26.00 |
| New London, Conn | 23.00 | 2.50 | 25.50 |
| New York, N. Y | 40.00 | 4.50 | 44.50 |
| Philadelphia, Pa | [b] 30.00 | 6.00 | 36.00 |
| Portland, Me | 30.00 | 9.00 | 39.00 |
| Providence, R. I | [c] 25.00 | 4.50 | 29.50 |
| Wilmington, Del | [d] 15.00 | 6.00 | 21.00 |
| SOUTH ATLANTIC. | | | |
| Baltimore, Md | 35.00 | 1.00 | 36.00 |
| Brunswick, Ga | 21.50 | 7.00 | 28.50 |
| Cape Charles, Va | 12.00 | 2.50 | 14.50 |
| Charleston, S. C | 28.00 | 5.00 | 33.00 |
| Jacksonville, Fla | [c] 24.50 | 0.80–4.50 | 25.30–29.00 |
| Newport News, Va | 35.00 | 2.50 | 37.50 |
| Norfolk, Va | 35.00 | 2.75 | 37.75 |
| Richmond, Va | 18.00 | 2.50–4.00 | 20.50–22.00 |
| Savannah, Ga | 26.00 | 6.10–6.50 | 32.10–32.50 |
| Washington, D. C | 24.00 | 3.00 | 27.00 |
| Wilmington, N. C | 26.00 | 2.50 | 28.50 |
| GULF OF MEXICO. | | | |
| Galveston, Tex | 30.00 | 1.25 | 31.25 |
| Houston, Tex | 25.00 | ..... | 25.00 |
| Mobile, Ala | 26.00 | 1.50 | 27.50 |
| New Orleans, La | 31.00 | ..... | 31.00 |
| Pensacola, Fla | 31.00 | [e] | [e] |
| Port Arthur, Tex | 26.00 | ..... | 26.00 |
| Tampa, Fla | 24.00 | 2.50 | 26.50 |
| Texas City, Tex | 25.00 | ..... | 25.00 |
| PACIFIC. | | | |
| Los Angeles, Cal | 30.00 | 5.00 | 35.00 |
| Oakland, Cal | 23.70 | 4.50 | 28.20 |
| Portland, Oreg | [c] 28.00 | 7.00 | 35.00 |
| Port San Luis, Cal | 20.00 | 3.75 | 23.75 |
| Sacramento, Cal | 7.00 | ..... | 7.00 |
| San Diego, Cal | 30.00 | 5.00 | 35.00 |
| San Francisco, Cal | [f] 40.00 | 3.75 | 43.75 |
| Seattle, Wash | [e] | ..... | [e] |
| Stockton, Cal | 6.00 | 3.00 | 9.00 |
| Tacoma, Wash | [e] | 13.00 | [e] |

[a] As reported by the Coast and Geodetic Survey.
[b] Being dredged to 35 feet.
[c] Being dredged to 30 feet.
[d] Being dredged to 21 feet.
[e] Deep enough for any draft.
[f] In north channel around the bar and from 30 to 60 feet within the harbor.

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*Commerce of the Atlantic ports.*—The relative importance and general character of the selected ports along the seaboard are clearly indicated by the extent and character of their commerce. A majority of these ports are chiefly of local importance, only a few of them being national in character. A list of national ports, or those that are the gateways of important trade routes, serve a large hinterland, and have an extensive and diverse commerce, would assuredly include New York, Boston, Philadelphia, and Baltimore on the Atlantic seaboard; New Orleans and Galveston on the Gulf of Mexico; and San Francisco, Seattle, Tacoma, and Portland, Oreg., on the Pacific coast.

In point of tonnage, coal is the most important commodity at practically all of the ports of the north Atlantic seaboard. New York and Philadelphia are the principal shipping points for coal, large quantities of both anthracite and bituminous coal being brought by rail to these ports and transferred to barges that are towed to Bridgeport, New Haven, New London, Providence, Fall River, New Bedford, Boston, and Portland, Me. A large intraharbor traffic in coal is also carried on at the port of New York, the coal being unloaded into barges at the various railroad terminals on the New Jersey shore and carried to the wharves of retail coal dealers on the Harlem River, Gowanus Canal, and other waterways, or to manufacturing, gas, and power plants on the East and Hudson Rivers and Newtown Creek.

The commerce of the selected ports in New England consists very largely of coal brought not only from New York and Philadelphia but also from Baltimore, Newport News, and Norfolk. Large and well-organized fleets are engaged regularly in this trade, such fleets being particularly noteworthy in the case of the traffic between the Hampton Roads ports and Boston. It means much to industrial New England that the bituminous coal which is required for its mills and must be secured from a great distance can be transported at cheap water rates.

The port of Boston has an extensive foreign trade, ranking, as a rule, fourth among the ports of the country in the value of trade with other countries. Its imports are generally more than twice as valuable as its exports. The port of Boston serves industrial New England as a channel for securing foreign raw materials for its shoe factories and for its woolen, cotton, carpet, sugar, and paper mills, but the port is not used to a large extent for the exportation of the finished products of New England. While the imports are made up chiefly of hides and skins, Egyptian cotton, raw wool, burlaps, sugar cane, fibers, wood pulp, and other raw materials, the exports consist largely of meat products, raw cotton (by transshipment from vessels from southern ports), and breadstuffs. The coastwise trade at the port of Boston consists largely of coal, cotton, and lumber.

Receipts of anthracite and bituminous coal form more than two-thirds of the commerce of the ports of Hartford, Portland, Me., and Providence; more than three-fifths of the commerce of Bridgeport, Fall River, and New Haven; and more than three-fourths of the commerce of New Bedford. At all of these ports general merchandise is the most important group of commodities measured by value, while raw cotton also is an important item at the ports of Fall River, New Bedford, and Providence. It should be noted, however, that practically all of the cotton received at Fall River and New Bedford and much of that received at Providence is transshipped at New York.

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Fall River is primarily a transshipping port for freight between Boston and New York, while the importance of New London is due in a large measure to the volume of through traffic between Canadian points and New York.

Philadelphia ranks third among the ports on the Atlantic seaboard in shipments of coal, first in receipts of iron ore, and probably first also in receipts and shipments of oil. This port ranks high also in shipments of grain and flour. A study of the list of commodities comprising the foreign trade of the port of Philadelphia shows that the imports consist very largely of raw materials for the manufacturing industries of the city and its immediate hinterland, the most important materials of this class being iron ore and magnesite, hides and skins, wool, raw sugar, drugs, and chemicals (chiefly for the important dyeing establishments in the city), while the exports are made up in a large measure of petroleum and its refined products, wheat, wheat flour, etc. The coastwise trade of the port, so far as value is concerned, consists mainly of general merchandise, including the finished products of the extensive and varied industries of the city; but coal, petroleum and gasoline, lumber, chemicals, fertilizers, etc., form the bulk of the coastwise tonnage.

Among the selected ports on the south Atlantic seaboard, Baltimore, Newport News, Norfolk, and Savannah are the most prominent. The commerce of the port of Baltimore is more largely national than that of any other south Atlantic port. In an extensive list of commodities handled at this port, the most valuable are general merchandise, boots and shoes, tobacco, coal, and fertilizer materials.

Baltimore is one of the most important grain-shipping ports on the Atlantic seaboard. This port is used largely also for exports of refined copper, tobacco, raw cotton, and iron and steel manufactures. While the foreign trade, as measured by value, of the ports of Boston and Philadelphia consists very largely of imports, that of Baltimore is composed chiefly of exports. It is interesting to note that iron and manganese ores form more than one-half of the import tonnage of this port, while materials for the fertilizer and chemical plants in the city also constitute a large proportion of the imports.

Newport News owes its prominence to the fact that it is the tidewater terminus of an important railroad system, the Chesapeake & Ohio Railway, which taps extensive coal fields. Newport News is preeminently a coal-shipping port, since more than two-thirds of the tonnage handled here consists of bituminous coal. The shipments of grain, which are also large, form the bulk of the foreign trade of this port. Since the outbreak of the war in Europe, the foreign trade of Newport News has been very extensive, especially in shipments of grain, horses, and mules.

Norfolk, like Newport News, is preeminently a coal-shipping port, more than one-half of the tonnage consisting of bituminous coal. This port ranks next to the port of New York in coastwise shipments of coal and is probably first in the bunker-coal trade. General merchandise forms the most valuable portion of the coastwise trade. The foreign trade is small and is composed principally of exports. The imports consist largely of nitrate of soda and other raw materials for the numerous fertilizer plants in the city, while the exports consist chiefly of lumber, coal, and raw cotton.

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The importance of the port of Washington is due very largely to the transportation of naval ordnance between the naval gun factory and the proving grounds. The port of Cape Charles is important only as a transshipping point for freight moving between Norfolk and New York City over the Pennnsylvania Railroad system.

The commerce of the ports of Wilmington, N. C., Charleston, and Brunswick consists almost exclusively of shipments of cotton to both foreign and domestic ports and of receipts of fertilizer materials from foreign countries, and general merchandise from domestic ports.

Savannah is the leading port in the United States in shipments of naval stores and ranks next to Galveston as a cotton-shipping port. The shipments of lumber and the receipts of materials for the manufacture of fertilizer are also extensive.

*Commerce of the Gulf ports.*—Among the ports on the Gulf of Mexico, Galveston and New Orleans are the most prominent. Foreign trade predominates in a marked degree at Galveston and consists very largely of shipments of raw cotton. Galveston is the greatest cotton-shipping port in the world. It is interesting to note that the most important item in the coastwise trade of Galveston is copper ore and bullion, which are shipped chiefly to smelting and refining plants at the port of New York.

New Orleans has a more diversified foreign and coastwise trade than any other port on the Atlantic and Gulf coasts, with the exception of the port of New York. A study of the imports at New Orleans shows large receipts of coffee, raw sugar, sisal, burlap, and bananas, while a list of exports shows that the principal shipments to foreign countries are raw cotton, oil, wheat, leaf tobacco, lumber and staves, lard, and flour. New Orleans ranks next to the port of New York in the value of its trade with Central America. This port leads in receipts of bananas, sisal, and burlap and is second in receipts of coffee and raw sugar. The coastwise trade at New Orleans is diverse, lumber, rice, sugar, and molasses being the most important items.

More than four-fifths of the commerce of the port of Mobile consists of trade with foreign countries. This port ranks next to the port of New York in the value of its trade with the West Indies. The bulk of the commerce consists of cotton and lumber.

The port of Tampa has a large general trade with Cuba. More than one-half of the tonnage of this port consists of phosphate rock, the most extensive beds of phosphate in the world being located in the vicinity of Tampa.

The commerce of Pensacola consists largely of foreign trade, the great bulk of the traffic being composed of exports of cotton, lumber and timber products, and naval stores.

Port Arthur is primarily an oil-shipping port, more than four-fifths of the value of commerce at this port consisting of petroleum products. The bulk of the water-borne traffic at Texas City is made up of cotton exported to foreign countries, while the most valuable part of the commerce at Houston has consisted of cotton moved by barges to Galveston.

*Commerce of the Pacific ports.*—San Francisco is the most important port on the Pacific coast. It is a general-commodity port and ranks high in the value of its foreign trade, its trade with the Orient being particularly important.

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Seattle has a large trade with the Orient, as is indicated by the large volume of raw silk imported annually; in 1913 the value of raw silk imported at Seattle was $14,472,495, or more than 20 per cent of the total imports for that port. Flour, wheat, salmon, and raw cotton were the principal exports. A large proportion of the coastwise trade at Seattle consists of salmon and lumber.

Tacoma shares with Seattle in an extensive oriental trade. The foreign trade of both ports is much more extensive than the domestic trade. The shipments of raw cotton and flour to China and Japan are greater from Tacoma than from Seattle. Tacoma is the leading grain port on the Pacific coast. A prominent feature of the coastwise trade at Tacoma is the large outbound volume of copper and lead ores and smelter products.

The commerce of the port of Portland, Oreg., is distinguished by the marked predominance of exports of wheat, barley, flour, and lumber in the foreign trade. In the coastwise trade receipts of oil from the California fields form an important item, while receipts of sugar and coffee also are large. The most important coastwise shipments are wheat, lumber, and flour.

Oakland is primarily a transshipping point, which is due to its location on the mainland opposite the port of San Francisco. Approximately two-thirds of the commerce credited to Oakland is carried on ferries and car floats plying between the cities of Oakland and San Francisco. An extensive lumber traffic is handled at Oakland.

The ports of Sacramento and Stockton are inland river ports whose commerce consists largely of fruit and farm produce shipped to San Francisco and of general merchandise received from that city.

Los Angeles and San Diego are new ports and have comparatively little foreign trade. The bulk of the tonnage handled at both ports consists of lumber and oil, but general merchandise is by far the greatest item in value. Port San Luis is almost exclusively an oil-shipping port.

*Commerce of the Great Lakes and river ports.*—A majority of the Great Lake ports included in the present study are engaged chiefly in handling iron ore or bituminous coal or both. This is true in a marked degree of Ashtabula, Charlotte (Rochester), Cleveland, Conneaut, Fairport, Huron, Lorain, Sandusky, South Chicago, and Toledo on the lower lakes and of Ashland, Duluth, Superior, Escanaba, Marquette, and Two Harbors on the upper lakes. It is true, but in a lesser degree, of Buffalo and Milwaukee.

Since the movement of iron ore and coal is on the whole in opposite directions and since both commodities can be carried in the same class of vessels, it is natural that the ports that lead in the receipts of iron ore should lead also in shipments of bituminous coal, especially since these ports are most convenient to the coal fields of Ohio, Pennsylvania, and West Virginia. At Charlotte and Sandusky, however, the great bulk of the commerce consists of soft coal and no iron ore is received, while Buffalo differs from the others named in that its coal shipments consist entirely of hard coal.

Chicago, Duluth-Superior, Milwaukee, and South Chicago have a large grain and flour shipping trade, while Buffalo and Erie are prominent grain and flour receiving ports. Chicago, Duluth-Superior, and Tonawanda have a large commerce in lumber, Duluth-Superior being primarily a shipping port and Chicago and Tonawanda, receiving ports.

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The commerce of the ports of Grand Haven, Ludington, and Manitowoc consists very largely of car-ferry traffic across Lake Michigan. Car-ferry traffic also forms more than one-eighth of the water-borne commerce of Milwaukee.

Only a few ports on the Great Lakes have a large traffic in general merchandise, these being Buffalo, Chicago, Cleveland, Detroit, Duluth-Superior, Erie, Milwaukee, and South Chicago. In view of the many important cities and manufacturing centers along the shores of the Great Lakes and of the long hauls between them, it is surprising that a much more extensive general-commodity traffic does not now exist. Various reasons might be given to account for the small amount of general merchandise carried in vessels on the Great Lakes. In the first place, the season of navigation averages only eight months. In the second place, the principal lines of vessels carrying general freight have been controlled by railroad companies which have probably been more interested in their rail traffic than in their lake business. A third cause is the fact that, until recent years, there has been no law compelling railroads to make through rail-and-lake rates and to issue through bills of lading to shippers using independent lines of steamers. Another obstacle has been the practice pursued by the railroads of charging more for the local rail haul from Buffalo to the seaboard on certain commodities that are taken to Buffalo by boat than the proportionate share of the all-rail haul from Chicago to the seaboard points. The local rail rate from Buffalo to the seaboard was made so high as to leave little to the independent vessel owner for the lake haul on through rail-and-water traffic.

The effect on lake commerce of railroad ownership of lake steamship lines is clearly indicated in the following extract from the report of the Interstate Commerce Commission, made May 7, 1915, in the matter of lake-line applications under the Panama Canal act:

> No doubt, under joint operation, certain economies can be effected, but these economies have not manifested themselves in a reduced lake-and-rail transportation cost to the public. Instead of any reduction in lake-and-rail rates they have been steadily advanced under joint ownership. Beginning about 1900, when trunk-line control over the lake lines was becoming perfected, the first-class lake-and-rail rate from New York to Chicago has been advanced by successive increases from 54 cents to 62 cents; the rates on the other classes have been correspondingly advanced. In 1910, according to statements in the records which were not controverted, the trunk-line interests agreed that the lake-and-rail rates should actually be advanced to the all-rail basis and thus wipe out the differential except on first class, which was to be advanced from 62 to 70 cents. This action was only thwarted by the refusal of a foreign railroad owning a lake line to acquiesce therein. These successive advances, as the records show, have had the effect not only of preventing an increase in lake-line tonnage, but in diverting from the lake routes to the all-rail lines part of the tonnage which formerly moved on the Lakes. Furthermore, there is much in the records tending to show that the very purpose of these advances in lake-and-rail rates was to divert tonnage to the all-rail lines. As a direct result of this rate policy of the owning railroads, the lake boats have operated with small cargoes, although their operating expense was almost as great as if they had been fully loaded. This has in turn resulted in a high operating cost to the lake lines per unit of freight. Does not this policy fully explain the lake-line deficit? Again, do not such facts make clear that whatever economies might be realized by joint ownership are offset by the waste resulting from the unfair use of vessel tonnage in the interest of the owning railroads? The railroad control of these boat lines can not be said to be in the public interest when the policy of these railroads has been, by an artificial rate structure, to deprive the public of the natural benefits that would flow from a free use of this waterway.

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In this case the commission denied the applications of the Erie, the Grand Trunk, the Lehigh Valley, the New York Central, the Pennsylvania, and the Rutland Railroads to continue the operation of lake steamship lines. Before December 1, 1915, according to the order of the commission, the Erie Railroad Co. must dispose of the vessels operated as the Erie Railroad Lake Line and of its interest in the Mutual Transit Co.; the Grand Trunk Railway Co. must dispose of its interest in the Canada Atlantic Transit Co.; the Lehigh Valley Railroad Co., of its interest in the Lehigh Valley Transportation Co.; the New York Central Railroad Co., of its interests in the Mutual Transit Co. and the Western Transit Co.; the Pennsylvania Railroad Co., of its interest in the Erie & Western Transportation Co.; and the Rutland Railroad Co., of its interest in the Rutland Transit Co.

Only two ports on the Mississippi River system have been included in this report. This fact bears eloquent witness to the decline of traffic on the Mississippi and its tributaries. The great bulk of the tonnage credited to Pittsburgh and Cincinnati consists of bituminous coal. The package-freight traffic at Pittsburgh has declined greatly in recent years, but at Cincinnati this traffic is still considerable.

**Commercial statistics.**—The statistics of the commerce of the several ports relate to the calendar years 1913 and 1914 and have almost uniformly been taken from the annual reports of the Chief of Engineers of the United States Army for 1914 and 1915, respectively. These statistics are the only data of an official nature that include coastwise and local as well as foreign trade for all of the selected ports. The data contained in the reports on Commerce and Navigation issued by the Bureau of Foreign and Domestic Commerce cover foreign trade only and they have been used in the case of a few ports where the statistics published by the Chief of Engineers do not disclose the extent of the foreign trade of the port. In some cases statistics compiled by local commercial organizations have also been used in a supplementary manner.

The United States Army engineers in charge of river and harbor improvements are required to compile statistics showing the volume and value of the annual movement of commerce through harbors and over waterways under improvement by the United States. The first legislation on this subject was contained in the rivers and harbors act of 1866 which provided as follows:

SEC. 2. *And be it further enacted* * * * And he shall also state in what collection district each work is located, and at or near what port of entry, lighthouse, or fort; what amount of revenue was collected at the nearest port of entry for the last fiscal year; and, as far as practicable, what amount of commerce and navigation would be benefited by the completion of each particular work: *Provided*, That he shall continue to make such a report at the commencement of every session of Congress until the works herein provided for shall be completed.

Approved, June 23, 1866.

In 1891 Congress passed supplementary legislation to facilitate the collection of these statistics. This act, which was approved February 21, 1891, reads as follows:

*Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled*, That owners, agents, masters, and clerks of vessels arriving at or departing from localities where works of river and harbor improvement are carried on shall furnish, on application of the persons in local charge of the works, a comprehensive statement of vessels, passengers, freight, and tonnage.



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SEC. 2. That every person or persons offending against the provisions of this act shall, for each and every offense, be liable to a fine of one hundred dollars, or imprisonment not exceeding two months, to be enforced in any district court in the United States within whose territorial jurisdiction such offense may have been committed.

Ample power and authority are conferred upon the district engineers by these acts, but unfortunately the allowance for clerical assistance for practically all of the district engineer offices is too small to permit much time to be devoted to the collection and compilation of commercial statistics. The engineers do their best with the facilities at hand, but few of them are thoroughly satisfied with the results.

The manner in which the statistics are generally collected and verified is indicated in the following extract from a memorandum on the subject which was prepared by Col. George A. Zinn, in charge of the Philadelphia district:

Exports and imports are compiled from customhouse records, which is considered the most reliable source for obtaining this information. Coastwise and domestic commerce is compiled from returns made to this office by shippers, consignees, and carriers.

In collecting the data for coastwise and domestic commerce, there is sent to shippers, consignees, and carriers a circular letter explaining the object and importance of the statistics in connection with waterway improvement, and requesting their cooperation to enable this office to obtain the information necessary for the compilation of reliable statistics. In cases where no response is received to this circular letter within a reasonable time, a personal visit is made to the party.

Following the receipt of responses to all the circular letters, the figures are then carefully compiled, care being taken to prevent duplications, and if the quantities named for any particular item appear inconsistent or out of proportion, an investigation is made regarding the commodity in question.

There is some difficulty in collecting statistics for coastwise and local commerce, not only on account of the large amount of traffic existing at this point, but on account of the reluctance of many shippers to furnish the information desired. In my opinion the collection of these statistics would be simplified if all coastwise vessels were required by law to furnish copies of their manifests to the engineer offices at the ports where they trade. To cover closely the strictly local trade of a stream, like the Delaware River, would require the time of four or five men, as much of the traffic is naturally carried on in small crafts where little or no record is kept.

In a number of cases the district engineers rely wholly upon the statistics compiled by local commercial organizations, which, it is believed, are in many cases accurate and fairly complete.

One drawback to the use of the statistics compiled by the Army engineers is their general lack of comparability. No uniform classification of commodities is followed; consequently, the character of articles comprised in such groupings as "general merchandise" and "miscellaneous" can not be ascertained, even by the process of elimination. Moreover, in most cases foreign trade is not distinguished from coastwise and local trade and in many instances shipments are not separated from receipts.

In connection with this report considerable attention has been given to the subject of the improvement of the present method of reporting statistics of commerce, and it is believed that a uniform classification of commodities should be adopted for all sections of the country. This classification should be based upon a careful study of the classifications now used by the several engineers and of those followed in the reports of the Bureau of Foreign and Domestic Commerce, so that there might be the least possible disturbance of present methods and, at the same time, the greatest possible harmony in classifications of foreign and of coastwise and local trade.

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The preparation of a uniform classification would entail comparatively little expense and might be made within a short time by representatives of the Chief of Engineers of the United States Army and of the Chief of the Bureau of Foreign and Domestic Commerce in joint conferences. A uniform classification could be followed by each district engineer with no more trouble and expense than the classifications now in use, and a long step toward securing comparability would be taken.

At the same time the district engineers might be requested to separate receipts from shipments. This would involve very little additional labor but would add much to the value of the data.

The separation of foreign and domestic trade would probably entail considerable labor, especially at the outset, but this, too, could be worked out on a satisfactory basis. The adoption of a uniform classification harmonizing as nearly as possible with the groupings now followed in the Commerce and Navigation reports would make it comparatively easy for collectors of customs to prepare the data on foreign trade for the several district Army engineers.

Since statistics of tonnage are of chief importance for the purposes of the Army engineers and are not shown for a number of commodities reported in the Commerce and Navigation reports, a standard table of weight equivalents might be adopted which would make it possible to reduce all quantities to a tonnage basis. This table might also be used in reporting weights of commodities in the domestic trade.

**Extent and ownership of water front.**—Statistical comparisons of length of water front are apt to be neither scientific nor particularly illuminating, for the reason that frontage has widely varying values, not only at different ports, but even in different parts of the same port. A number of factors must be taken into consideration in making comparisons, the most important being the commercial importance of the port and the location of the frontage with respect to proximity to deep channels and to ease of access to the main commercial section of the city. For instance, at the port of New York, 300 feet of water-front property on the Hudson River at Twenty-third Street is much more valuable than an equal amount of frontage on the Harlem River or even on the Hudson near the Battery, where the pierhead line restricts the length of the piers.

While comparisons as to total length of water front in various cities are of little value, it may be of interest to call attention to the fact that few of the selected ports are seriously limited in the amount of frontage available. The more important ports on the seaboard have unusually large amounts of frontage. For example, New York has 921 miles; Boston, 141 miles; Philadelphia, 37 miles; Baltimore, 120 miles; Norfolk, 26 miles; New Orleans, 41.5 miles; Galveston, 8 miles; San Francisco, 8 miles; and Seattle, 113.9 miles. A number of interior ports also have a large amount of available water front, as, for example, Buffalo, 37.4 miles; Chicago, 67 miles; Milwaukee, 20 miles; and Duluth-Superior, 49 miles.

The length of water front available at a port is not so important a matter as the character of ownership. The Report on Water Terminals issued by the Bureau of Corporations in 1910 called attention in a striking manner to the lack of public ownership of water frontage

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at the great majority of the ports in this country. This condition has, on the whole, changed greatly during the past five years. There has been a decided tendency toward public ownership of water-front property, due in part to a recognition of the community value of a port and, in part, to the increasing tendency of Congress to require communities receiving Federal aid in harbor and waterways improvements to maintain public terminals.

Only a few of the larger ports, namely New Orleans, San Francisco, Los Angeles, and San Diego, own the major portion of their water frontage or are in a position to acquire the bulk of it. The ports of Oakland, Sacramento, Stockton, and Washington are similarly placed. These are the only selected ports in which the public interest is dominant. It will be noted that six of the eight ports are situated in California.

Although at each of the other selected ports the frontage owned and controlled by the State or city is less than one-half of the total available frontage, still such frontage represents a substantial interest at most of the larger ports. This is true of the ports of New York, Boston, Philadelphia, and Baltimore on the Atlantic coast and of the ports of Seattle and Tacoma on the Pacific coast. Attention should be directed to the fact that noteworthy progress toward dominant public ownership of water-front property has been made in recent years at the ports of Baltimore, Boston, Hartford, Jacksonville, New Bedford, New London, Pensacola, Philadelphia, Providence, Portland, Oreg., Seattle, Tacoma, and Tampa.

Nevertheless at such important ports as Galveston, Norfolk, and Savannah the amount of water frontage publicly owned is a negligible quantity. This is true also of the ports of Bridgeport, Cape Charles, Charleston, Fall River, New Haven, Port Arthur, Port San Luis, Wilmington, N. C., and Texas City. The ports of Cape Charles, Port Arthur, Port San Luis, and Texas City, it should be noted, have been developed largely by private enterprise.

Among the larger ports on the Great Lakes there is a tendency toward public ownership, although at none of these ports is the public interest particularly strong. Cleveland, Chicago, Buffalo, and Milwaukee rank in the order named in the extent of the public interest in water-front property. Superior and Ashland also have recently acquired considerable water frontage.

It should be noted, however, that the commerce of a majority of the ports on the Great Lakes consists largely of bulk freight, which is efficiently handled by existing private agencies. The need of extensive publicly owned frontage is therefore not urgent at these ports.

**Terminals, public and private.**—The majority of the selected ports on the seaboard own public terminals. Included in this list are the important ports of New York, Boston, Philadelphia, and Baltimore, on the Atlantic seaboard; New Orleans, on the Gulf; and San Francisco, Seattle, Tacoma, and Portland, on the Pacific coast.

Excellent public terminals have been constructed during the past five years or are now under construction at the ports of Jacksonville, New Bedford, New London, and Providence on the Atlantic coast, and Los Angeles and San Diego on the Pacific coast. Among the other ports with public terminals of commercial importance are Mobile and Stockton.

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Fourteen of the forty-two selected ports on the seaboard have no publicly-owned terminals of commercial importance. They are as follows: Bridgeport, Brunswick, Cape Charles, Charleston, Fall River, Galveston, Norfolk, Pensacola, Port Arthur, Portland, Me., Savannah, Texas City, Wilmington, Del., and Wilmington, N. C. Three of the above-named cities, Cape Charles, Port Arthur, and Texas City, owe their development as ports almost entirely to private enterprise, which has provided ample facilities. Because of this fact, and because the cities are small, it is not surprising that they have no public terminals.

Reliance chiefly upon the port facilities provided by railroad companies is to be found at Portland, Me., Fall River, Norfolk, Charleston, Brunswick, Savannah, and Pensacola, and reliance chiefly upon a private wharf company, at Galveston. It will be noted that three of the largest ports in the United States are included in the above list, namely, Galveston, Norfolk, and Savannah. The city of Galveston, however, has an interest (24 per cent of the capital stock) in the Galveston Wharf Co., which dominates the port situation in that city, and the city of Savannah has considerable frontage capable of development, although there is little immediate prospect of any public terminals being constructed; but the city of Norfolk owns as yet practically no frontage of commercial value and has rather poor prospects of acquiring any.

The development of Galveston, Norfolk, and Savannah as ports is due in part to their location and in part to the provision of terminal facilities by private interests. The extreme importance of the latter factor may be seen in the rapid rise of ports such as Port Arthur and Texas City.

All of the selected ports that now rely wholly upon private facilities have given more or less attention to the need of providing publicly-owned terminals, but at only one, Fall River, is it at all probable that public facilities will soon be provided. The demand for public terminals seems weak indeed at all of those ports except Fall River and Pensacola. The last-named city has gone so far as to authorize the issuance of $450,000 in bonds for harbor improvements, but has found the financial markets unfavorable for the sale of these bonds.

New Orleans and San Francisco lead in the extent of public terminals under public control. At both of these ports the entire water front is not only publicly owned or subject to expropriation at any time for public use, but it is also largely improved by an adequate system of public terminals under immediate public control. Moreover, at both of these ports the terminals are coordinated by belt-line railways which are also under public control and operation. A high degree of success has attended the public administration of port affairs in these cities.

The city of New York owns the greater part of the most important frontage at that port and has constructed a large number of excellent piers, but has leased for long terms to private interests practically all of these terminals. Pier rentals yield the city of New York a handsome revenue, but the policy of leasing its terminals for long periods prevents an effective public control and makes extremely difficult any effort to coordinate the terminal facilities of the port. The port of New York suffers severely from a lack of such coordination and, it is interesting to note, the city has recently appointed a commission of

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three engineers to study the organization of the facilities of the port with a view to their improvement and coordination in a comprehensive manner.

The State of Massachusetts has in recent years expended large sums to provide terminal facilities for the port of Boston, but the results of these expenditures have scarcely begun to appear and the commerce of the port still relies largely upon the terminals of the railroad companies. Boston has, however, the most expensive as well as the largest pier in the United States, if not in the world. Commonwealth Pier No. 5 has cost upward of $4,000,000 and is 1,200 feet long and 400 feet wide. This port will have one other distinction, that of owning the largest dry dock in the Western Hemisphere. Already work has begun on the construction of a dry dock 1,200 feet in length.

The city of Philadelphia has constructed a number of public terminals in recent years. These terminals are far more important factors in the commerce of the port than are those in Boston. Private enterprise had provided extensive water terminal facilities at Boston long before the public terminals were built, but the private terminals at Philadelphia, except those for handling coal, were not important when the city of Philadelphia began its work of development.

The city of Baltimore has constructed a number of excellent public terminals within the last 10 years and is now engaged in the construction of a marginal street and railroad to coordinate the facilities of the port.

Among notable instances of port development in the smaller ports on the Atlantic seaboard, special mention should be made of Providence, where both State and city are providing extensive terminals; New London, where the State of Connecticut is building a large and substantial pier with a large shed and a connecting railroad; and Jacksonville, where the city alone is constructing two large piers, pier sheds, and a connecting railroad. The general interest in port development is well illustrated by the aid which the States of Connecticut, Rhode Island, and Massachusetts are giving to the respective ports of New London, Providence, and New Bedford.

The most noteworthy progress made in recent years in port development has been shown by the leading ports on the Pacific coast, namely, San Francisco, Seattle, Los Angeles, Portland, Oreg., Tacoma, and San Diego. In no section of the country has the importance of publicly-owned terminal facilities been more intelligently understood and in none has such large expenditures been made during the last five years for port improvements.

The port of Seattle has made notable progress in the development of a system of public terminals. No port in this country has made greater progress in this direction during recent years. The port of Seattle was the first to provide a public grain elevator and public warehouses for general and special storage. The only storage facilities provided in connection with public terminals at most ports are those to be found in transit sheds on piers or wharves.

Los Angeles has virtually created a port for itself during the last five years. The natural location was not favorable, but at great cost this disadvantage has been largely overcome and a substantial beginning has been made toward the creation of a comprehensive and adequate system of public terminals.

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Portland, Oreg., and Tacoma have provided excellent public terminals since 1910 and San Diego now has one public pier. All of these ports plan to increase the number of public terminals.

Only two of the selected ports on the Great Lakes, namely, Chicago and Erie, have publicly-owned terminals of commercial importance. Chicago has recently completed a large pier on the lake front and conditions at this port will doubtless be greatly improved thereby. The port of Erie has had for a number of years a public pier, erected by the State of Pennsylvania.

Cleveland has a potential interest in a large pier recently constructed in the outer harbor by two of the principal passenger steamboat lines calling at that port. The city will acquire title to this pier at the end of 40 years or may, under the terms of the lease affecting this project, acquire the pier by purchase at any time before the expiration of the lease.

A number of the other lake ports own small wharves, but these are for the most part at street ends and can be used only for small excursion boats, tugs, launches, and other small craft.

Because of the generally restricted character of the commerce of the Great Lakes and the obstacles that have prevented the development of a large package-freight business, the need of public terminals has not as yet been strongly felt.

Both of the selected ports on the Ohio River, Cincinnati and Pittsburgh, have long maintained public terminals. It is interesting to note that the public terminals at Pittsburgh occupy frontage granted for that express purpose by the heirs of William Penn, while the frontage now occupied by the public levee at Cincinnati was expressly dedicated to that use in the ordinance of 1787 creating the Northwest Territory.

**Type of wharf construction.**—In this report an attempt is made to distinguish by the use of precise terms the several types of water terminals. Unfortunately, the terminology in common use is not precise; for example, the words "wharf," "pier," and "dock" are used to describe any place where boats may tie up. It would be well, in the opinion of the writer, if a definite nomenclature could be adopted along the lines suggested by Mr. W. J. Barney, secretary of the American Association of Port Authorities. In a paper on "Types of American Public Wharf Construction," [a] Mr. Barney made the following distinction between types of water terminals: "Wharf is the general term for a landing place for vessels and cargoes. A pier is a wharf structure that projects into the stream or fairway. Slips are the open water spaces or docks between adjacent piers. Quays are wharves parallel to or lying along the shore."

It has not always been possible to adhere to these distinctions, since at a number of ports the terms "wharf" or "dock" have long been commonly used in the designation of terminals. Thus at Boston some of the piers along the Atlantic Avenue water front have been known for scores of years as India Wharf, Lewis Wharf, T. Wharf, etc., and at certain ports on the Great Lakes, the iron-ore and coal terminals have been generally and for years referred to as "ore docks" and "coal docks." Consequently, terms which would more

[a] Proceedings of American Association of Port Authorities, Third Annual Convention, Baltimore, Sept. 8, 9, and 10, 1914.

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adequately describe the form of construction have not been used in such cases.

The term "dock" is properly used in describing the type of terminal in which the structures are provided with locks and gates. At the English ports of Liverpool and London docks are necessary on account of the great range of tides, but in this country extreme ranges of tides are not factors in the character of terminal construction.

The form of terminal adopted for a port depends largely upon the width of channel. The tendency is to use piers wherever possible, since they provide the greatest amount of berthing space at the least expense and also, as a rule, the maximum facility in the interchange of freight between car and vessel. Where, however, the width of the channel is insufficient to warrant the construction of piers, wharves parallel to the channel or to slips excavated into the mainland must be the form of terminal used.

The pier-and-slip form of wharf construction is the prevailing form at practically all of the selected ports along the seaboard; the longitudinal wharf or quay, at the ports on the Great Lakes; and the sloping levee with wharf boat adjustable to the varying stage of water, at the ports on the Mississippi River system.

Notable instances of the use of quays are to be found also at Providence, Portland, Oreg., Sacramento, Seattle, Stockton, and Tacoma. The unusual depth of water close to the shore prevents the construction of piers at the ports of Seattle and Tacoma, but the comparative narrowness of the channels dictates the use of quays at the other ports named. At Providence a municipal quay wall 3,000 feet in length has recently been constructed.

Piers are, as a rule, of open-pile construction in part, since they are in most cases built out to the pierhead line and since the rules of the War Department require that no solid-filled structure shall be built beyond the bulkhead line, which is frequently close to the shore line.

Pile and timber are the prevailing construction materials used in the United States, but there is a marked tendency toward the use of more substantial materials, such as concrete piles, interlocking steel-sheet piling, and a combination of timber piles cut off at the mean low-water mark with concrete superstructure. The combination of timber piling with concrete superstructure is the most common of the newer types of contruction.

**Port administration.**—In discussions of port administration in the United States it is desirable that a distinction be made between the harbor and the port. The harbor may be defined as consisting of the waterways and channels as far in as the pierhead lines and the port to include everything on the landward side of those lines, that is, to consist of the piers, slips, wharves, sheds, tracks, handling equipment, etc. This distinction, while technical and somewhat novel, tends to mark off distinctly the limits of the jurisdiction of the Federal Government and the jurisdiction of the State and municipal authorities. It can not be strictly observed in the present report because of the strength of prevailing local usage, which fails to distinguish between harbor and port.

*Influence of the Federal Government on port administration.*—The control of all navigable waters within the United States is vested under the Constitution in the Federal Government. This was definitely decided by the Supreme Court of the United States in the case

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of Gilman *v.* Philadelphia (3 Wallace, 713), in which the court held that—

> Commerce includes navigation. The power to regulate commerce comprehends the control for that purpose, and to the extent necessary, of all the navigable waters of the United States which are accessible from a State other than those in which they lie. For this purpose they are the public property of the Nation, and subject to all the requisite legislation by Congress. This necessarily includes the power to keep them open and free from any obstruction to navigation, interposed by the State or otherwise; to remove such obstructions when they exist; and to provide, by such sanctions as they may deem proper, against the occurrence of the evil and for the punishment of the offenders. For these purposes Congress possesses all the powers which existed in the States before the adoption of the National Constitution, and which have always existed in the Parliament in England.
>
> It is for Congress to determine when its full power shall be brought into activity and as to the regulations and sanctions which shall be provided.

By virtue of its power Congress has enacted from time to time various laws relative to the use of the navigable waterways of the country, the administrative enforcement of these laws being vested in the Secretary of War, under whose direction all improvements of waterways are made.

Thus the construction of piers, wharves, dams, tunnels, or bridges in such a manner as to reduce the width or depth or to impair the navigability of waterways is prohibited unless specifically authorized by Congress or, in certain cases, by the Secretary of War.

The influence of the Federal Government in port affairs is increased by the fact that Congress has appropriated large sums for improving harbors and that the ports of the country, as a rule, depend largely upon Federal assistance. In this way a large but indirect power is placed in the hands of Congress. Frequently appropriations for a local improvement are made subject to the performance or nonperformance of certain acts on the part of the locality benefited.

A marked tendency in rivers and harbors appropriation bills in recent years is to require localities seeking Federal aid for harbor or waterway improvements to contribute toward the expense or, what is much more significant, to provide public terminals. Illustrations of this tendency are shown in the cases of Providence, Savannah, and Tampa. (For details see pp. 134, 185, and 255, respectively, of this report.) In the case of Savannah, an appropriation for the improvement of Savannah River was made contingent upon the acceptance by the city of a tract of water-front property offered by private interests and upon the agreement of the city to improve the same by constructing a public terminal. In the case of Tampa, Congress stipulated that the city should acquire at least 1,400 feet of frontage on a new channel to be developed and that the city should control the remaining frontage on both sides for a distance of 700 feet back from the channel in such a manner as to make sure that all terminals should be open to public use on equal and reasonable terms and that all terminal charges should be subject to the approval of the Secretary of War. The conditions were agreed to in both cases.

Another illustration of this tendency on the part of Congress is the following condition on which an appropriation was granted for the improvement of the Providence River: "No work in the harbor proper north of Fields Point shall be done until the Secretary of War is satisfied that the State and city have completed their proposed expenditures * * * up to at least $2,000,000 for public terminals or other permanent public harbor improvements," etc.

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*Examples of Federal policy and intervention.*—Other instances might be mentioned to illustrate this tendency on the part of Congress, which apparently is proceeding on the theory that public terminals should constitute an essential part of a port that is improved at public cost.

Whatever action is taken by Congress is based upon the principle that rivers and harbors improved at the expense of the Federal Government should be used primarily for commercial purposes and this fundamental idea is gradually working itself also into the policies of the ports. In establishing harbor lines, in granting permission to make changes along the water front, and in other ways the Federal Government, through the United States Engineers in charge of harbor improvements, has uniformly followed this basic rule. In this way the Federal Government takes a farsighted view of the situation, while local authorities, because of lack of foresight or because of strained finances, are apt for a merely temporary advantage to dispose of their rights in harbor frontage without due regard to its possible future value for commercial purposes. Three illustrations are in point:

1. The city of Chicago has an extensive lake frontage, comparatively little of which is now used for commercial purposes. The plans of the South Park Commission call for the beautification and artistic development of the lake frontage south of Twelfth Street solely for parks and playgrounds. These plans take little or no account of the probable future value of that frontage for lake commerce. The South Park Commission went so far in the accomplishment of its plans that it had arrived at an agreement with the Illinois Central Railroad, whose tracks line the shore for a great distance and which claims the riparian rights to most of this frontage, whereby for the cession of its riparian claims the railroad was to acquire a considerable addition to its right of way while the park commission was to utilize the lake front for park and recreation purposes.

It was only when this matter came before the Secretary of War for his approval that any serious objection was offered to the plan. It so happened that the Army officer who was then Chief of the Corps of Engineers had been in charge of the Chicago Harbor District and knew the situation there. Solely upon his objection to the plan on the ground that it failed to provide for the future use of this frontage for commercial purposes and that the city of Chicago had not been a party to the agreement, Secretary Garrison refused to approve the plan of the South Park Commission. This was a case in which an agreement vitally affecting the future commercial importance of the Chicago Harbor had aroused comparatively little local interest and would probably have resulted in its permanent injury had it not been for the intervention of the Federal Government through the Chief of Army Engineers.

2. Another case in point is Cleveland. The situation there, as in Chicago, is complicated by the fact that much of the lake frontage is claimed by railroads—in this instance by the New York Central and the Pennsylvania lines. These railroads are anxious to have the Secretary of War establish a harbor line in the basin behind the east breakwater, but the Army engineers in charge have consistently refused to comply with this request, knowing that as soon as

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this line is established the railroads will commence to fill in the immense area thus created, just as the Pennsylvania Railroad did in the area behind the west breakwater. The interest of the Army engineers in the use of this harbor for purely commercial purposes was so great that one of them, Col. John Millis, devised a very ingenious and practical scheme for the development of the east basin whereby the riparian owners could have all that they were legally entitled to, the right of access to navigable waters, and at the same time the city would secure what it really should have, a series of piers running out into the lake behind the breakwater. His plan, simply stated, is to build a peninsula parallel with the shore and extending easterly from a large tract of made land which the city now owns. Between this peninsula and the shore line a channel at least 200 feet wide and 21 feet deep would be provided while in this peninsula provision would be made for slips opening toward the breakwater and long enough to accommodate the largest lake vessels.

This plan has been approved by the chamber of commerce and the city harbor commission and seems likely to be accomplished ultimately. The principle that the lake front should be used primarily for commercial purposes has so firmly taken hold of the commercial interests of the city that when the Otis Steel Co., which has a large plant behind the east breakwater and owns considerable frontage there, sought permission to fill out so as to increase their plant, the chamber of commerce went on record as against the proposition on the ground just stated and the steel company selected a site in the upper valley of the Cuyahoga River.

3. A third illustration of the Federal Government's influence in port administration is furnished by Buffalo. In spite of the united influence of all the commercial organizations in Buffalo, the United States Army engineer in charge of the Buffalo district has consistently refused to recommend that the channel entrance into the harbor be widened from its present width of 200 feet to 350 feet or more. Although the entrance is nominally 200 feet in width it is claimed by Buffalo citizens that it is practically only 175 feet wide, since no deep dredging can be carried on within 25 feet of the south Government pier. The practical width of the channel is still further diminished by reason of the fact that on the north pier the Delaware, Lackawanna & Western Railroad Co. maintains a coal dock at which vessels having as much as 65-foot beam are almost constantly placed for taking on cargoes of hard coal for the upper lake ports. These two conditions make the entrance to Buffalo River and the City Ship Canal, the busiest sections of Buffalo Harbor, extremely congested, but immediate relief could be secured if the Lackawanna Railroad were to follow the recommendation of the United States Army engineer that it transfer its coal docks to Coit Slip, which is away from but convenient to the channel entrance. It is, moreover, the claim of the United States Government that the railroad is squatting on part of this pier. The railroad refuses, however, to comply with the recommendation because of the expense involved, and in this refusal it is strongly supported by the local commercial organizations.

Better examples than these three to illustrate the influence that the United States engineers can exert in port development and administration would be hard to find. They show that the Federal Gov-

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ernment is apt to take a broader and more impartial view of port matters than many of the cities affected and it is extremely fortunate that there is a higher influence restraining action that would be of a purely emergency or temporary character.

*Powers of the Interstate Commerce Commission.*—In recent years another branch of the Federal Government has been given powers, the exercise of which may profoundly affect the development of ports in this country. The Interstate Commerce Commission by the exercise of its rate-making power alone is in a position to do much to aid or hinder the growth of a port; and it has in recent years received even more extensive power. Section 6 of the act to regulate commerce, as amended by the Panama Canal act of August 24, 1912, gives the Interstate Commerce Commission power—

> To establish physical connection between the lines of the rail carrier and the dock of the water carrier by directing the rail carrier to make suitable connection between its line and a track or tracks which have been constructed from the dock to the limits of its right of way, or by directing either or both the rail and water carrier, individually or in connection with one another, to construct and connect with the lines of the rail carrier a spur track or tracks to the dock. This provision shall only apply where such connection is reasonably practicable, can be made with safety to the public, and where the amount of business to be handled is sufficient to justify the outlay.
>
> The commission shall have full authority to determine the terms and conditions upon which these connecting tracks, when constructed, shall be operated, and it may, either in the construction or the operation of such tracks, determine what sum shall be paid to or by either carrier. The provisions of this paragraph shall extend to cases where the dock is owned by other parties than the carrier involved.

In construing its power under the above statutory provision the Interstate Commerce Commission held, in the case of the Mobile Chamber of Commerce et al. *v.* Mobile & Ohio Railroad et al.,[a] as follows:

> If physical connection did not exist between the rails of the railroad and the dock of the steamship company this commission would have authority to require the railroad to construct a spur track to the dock of the steamship company and to determine the terms and conditions upon which this connecting track should be operated. In view of this language it is no longer possible for the railroad to contend that the track running past the dock and within 10 feet of the warehouse of the steamship company is private and therefore subject only to its arbitrary regulation.
>
> The conclusion is that the practice of the railroad of refusing ship-side delivery to the steamship company on competitive traffic is unreasonable as well as unduly discriminatory. Also the conclusion is that the practice of the railroad in refusing to make delivery at the Jefferson Street wharf of shipments consigned to the steamship company is unreasonable as well as unduly discriminatory.

In giving the Interstate Commerce Commission power also to compel railroads to establish through rail-and-water routes and to publish joint rates with boat lines that "have met all reasonable requirements of connecting railroads with respect to security for freight charges, adequacy of service, efficiency of management and any other guarantee which may justly or lawfully be required"[b], Congress has taken an important step to check the decline of commerce on the inland waterways and to stimulate the rehabilitation of interior ports.

Section 5 of the act to regulate commerce, as amended by the Panama Canal act of August 24, 1912, gives the Interstate Commerce Commission a large measure of control over the operation of

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[a] 33 I. C. C. Reports, decided Nov. 30, 1914. [b] Idem.

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steamship lines by railroad companies. This section now provides that—

From and after the 1st day of July, 1914, it shall be unlawful for any railroad company or other common carrier subject to the act to regulate commerce to own, lease, operate, control, or have any interest whatsoever, by stock ownership or otherwise, either directly or indirectly, through any holding company, or by stockholders or directors in common, or in any other manner in any common carrier by water operated through the Panama Canal or elsewhere with which said railroad or other carrier aforesaid does or may compete for traffic, or any vessel carrying freight or passengers upon said water route or elsewhere with which said railroad or other carrier aforesaid does or may compete for traffic; and in case of the violation of this provision each day in which such violation continues shall be deemed a separate offense.

If the Interstate Commerce Commission shall be of the opinion that any such existing specified service by water other than through the Panama Canal is being operated in the interest of the public and is of advantage to the convenience and commerce of the people, and that such extension will neither exclude, prevent, nor reduce competition on the route by water under consideration, the Interstate Commerce Commission may, by order, extend the time during which such service by water may continue to be operated beyond July 1, 1914.

In pursuance of the power thus conferred upon it the commission has denied the application of a number of railroad companies that sought to retain possession of affiliated steamship lines. It is thought by many that the severance of the joint ownership of railroad and steamship lines will tend to stimulate competition on water routes and to develop water-borne traffic, particularly on the Great Lakes and the inland waterways.

In another respect also the Interstate Commerce act may work for the benefit of water transportation. Section 4 of this act, as amended June 18, 1910, provides that—

Wherever the carrier by railroad shall, in competition with a water route or routes, reduce the rates on the carriage of any species of freight to or from competitive points, it shall not be permitted to increase such rates unless after hearing by the Interstate Commerce Commission it shall be found that such proposed increase rests upon changed conditions rather than the elimination of water competition.

This provision is designed to prohibit the use of "fighting ships" or other similar methods of competition intended to prevent the development of independent steamship companies, but this provision does not appear to be important now that the Panama Canal act compels railroads to sever all connections with steamship lines except in those cases where the connection is "of advantage to the convenience and commerce of the people."

Under its general power also to determine the reasonableness of freight rates on interstate business, the Interstate Commerce Commerce Commission may exert a strong influence over port affairs. A case was brought before the commission by the Galveston Wharf Co.,[a] which objected to the practice of the Texas City Terminal Co. in making no wharfage charge on cotton, on the ground that the practical effect of giving such free wharfage was to reduce the rail rate on cotton shipped to Texas City and to make the practice contrary to the act to regulate interstate commerce. The Galveston Wharf Co. also objected to the fact that the Texas City Co. received a division of the through rail rate for performing what the former called "switching service." In deciding that the granting of free wharfage on cotton at the Texas City wharves was not illegal but was justified

[a] In the matter of wharfage charges of the Galveston Wharf Co. at Galveston, Tex., decided Apr. 15, 1913, 26 I. C. C. Reports, p. 696.

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by the less favorable location of the port of Texas City and also in ordering that the Texas City Terminal Co. should receive only a switching allowance instead of a division of the through rate, the commission did much to affect both ports.

*Types of port administration in the United States.*—A large number of the selected ports have no administrative authority charged with the supervision of port affairs. This condition is due in many cases to the fact that the population of the port is small and its commerce confined to a few articles of bulk freight, such as iron ore, coal, fertilizer materials, or lumber, and to the fact that ample port facilities are provided by railroad companies or other private interests.

Most of the selected ports on the Great Lakes have no public administrative official in charge of the port other than a harbor master, who is really a police official. The only Great Lakes ports with one or more officials engaged in port administration are Ashland, Buffalo, Chicago, Cleveland, Milwaukee, and Superior. Several ports on the seaboard, including Brunswick, Cape Charles, Port Arthur, Galveston, Texas City, and Port San Luis have no port-governing body or official except, in a few cases, a harbor master.

Among the selected ports that have one or more officials or a board or commission charged with the supervision of port affairs, four distinct and well defined types of port administration may be noted. These may be designated as (1) the municipal-department type, (2) the municipal harbor-board type, (3) the State harbor-board type, and (4) the independent port-authority type.

The prevailing type is the municipal-department type, in which the administration of the port is vested in a department or division of the municipal government, usually a department of public works, a division of an engineering bureau, or, as in the case of New York and Philadelphia, a distinct department of wharves and docks. In this form of administration the port policy is generally determined by the mayor and city council acting through a harbor committee, and it is liable to change with the election of a new mayor or a change in party. The immediate supervision of the port is delegated to a single official, whose tenure of office is generally the same as that of the mayor and who has general charge of the public works of the city. Any harbor-engineering work to be done by a city having this form of port administration is performed as a rule by engineers under the control of the city engineer.

The municipal-department type, it is apparent, is not an organized form of port administration. It has developed without thoughtful planning and takes little cognizance of the fact that water highways call for a form of administration differing from that provided for land highways. Under this form of administration only a purely local view of the waterway and harbor is taken by the municipal authorities and sight is lost of the fact that the port is in many cases the gateway to a large inland territory that has no other outlet. The municipal-department type is largely a casual and temporary form that continues until a municipality is required to engage in extensive harbor improvements. It suffices for small towns or for cities where the port facilities provided by private interests are considered ample.

The second type of port administration is the municipal harbor-board or commission form. In a number of cities the creation of this

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form of governing body for the port marks the first step in the evolution of port administration from the municipal-department type to the independent port-authority type. The creation of a municipal harbor board is a recognition of the fact that port affairs require special consideration and must be treated separately from the paving, repair, cleaning, and lighting of streets and the construction of sewers or other similar municipal affairs.

Frequently the municipal harbor board is merely an advisory commission of three or five members who serve without remuneration and for a short or indefinite term. The city council provides for such a board and the mayor appoints its members. Prominent men, as a rule, are selected and they devote to this work as much time as they can spare from their ordinary pursuits. They act, however, only in a purely advisory capacity and their recommendations may or may not be accepted by the mayor and council. Such a board performs auxiliary service only. This form of harbor commission is to be found in Milwaukee. Chicago and Cleveland had similar commissions, but the service of the former ended apparently with the filing of its report in 1909, while the latter was abolished in 1915.

In several cities the municipal harbor board is a permanent branch of the municipal government and is on a parity with other municipal departments. Such a board is created by ordinance of the city council and its members are appointed by the mayor. They serve for the same term as the mayor and generally without compensation. All port regulations and port charges and all appropriations for harbor improvements are made by the city council.

The most prominent port having the municipal harbor-board type of administration is Baltimore, although the harbor board of Baltimore is officially known as a subdepartment of the department of public improvements and has only one active member, its president, who is also known as the harbor engineer. Other ports with this form are Ashland, Los Angeles, and Portland, Oreg.

The State harbor-board type of governing body consists of a board of three, five, or more members appointed by the governor and responsible to the governor and the State legislature. Three of the most prominent ports in the United States have this form of port government, namely, Boston, New Orleans, and San Francisco, and it is worthy of note that New Orleans and San Francisco are generally regarded as the most successful ports in the United States in the public control and operation of port facilities.

A historical justification of State control of ports is that, under the common law and the constitutions of the several States, the control of navigable waterways within a State's border is vested in the sovereign or State government subject only to the exercise by the Federal Government of the power to regulate commerce, which was yielded to it by the several States upon the formation of the Union. Another justification is that a port serves not merely the city of which it forms an immediate part but other cities and towns along the same system of water highways and inland cities as well. In this larger view, a port is a gateway for both land and water routes and the manner in which the port is developed and its affairs administered affects the State as a whole.

The ports of Massachusetts have long been under the control of a State board, namely, the Board of Harbor and Land Commissioners.

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This board has general charge of the lands owned by the State and now controls all ports except Boston. The port of Boston was under the control of this board until 1911, but is now under the control of a separate State board.

The Board of Harbor and Land Commissioners has charge of two of the selected ports, Fall River and New Bedford, among others. This board made plans for and supervised the construction of the State pier recently built at New Bedford and it has made plans for a pier that the State will probably construct at Fall River. The jurisdiction of this board apparently does not exclude these cities from having municipal wharves operated by a department of the municipal government. The work of the State board merely supplements that of the municipality. The demand of these cities for State aid in building public piers is based, partly at least, upon a desire to share with Boston in the appropriation of State funds for port development.

The State of Connecticut has a board known as the Rivers, Harbors, and Bridges Commission. This commission, which was created in recent years, has jurisdiction over all of the ports in the State of Connecticut and has powers somewhat similar to those exercised by the Massachusetts Board of Harbor and Land Commissioners. Thus, the new State pier at New London was designed by, and is being constructed under the supervision of, the Connecticut Rivers, Harbors, and Bridges Commission.

All ports in Rhode Island are under the control of a board of harbor commissioners which has general supervision only and whose powers include principally the granting of licenses for the building of piers, wharves, bulkheads, or other structures on and along the navigable waterways of the State. Another State board, the Rhode Island Harbor Improvement Commission, was created in 1910 for the sole purpose of improving and developing shore property for public terminals at Providence, East Providence, and Pawtucket. This commission controls only the frontage which it has purchased, and its work, like that of the State commissions in Connecticut and Massachusetts, does not supersede but merely supplements that of the municipalities.

State boards exercising a very limited control over ports are to be found at Charleston, S. C., Portland, Me., and Wilmington, N. C. A detailed discussion of the organization of the State boards in charge of the ports of Boston, New Orleans, and San Francisco need not be given here, since this subject is treated fully in the description of each port.

Some differences in the powers and methods of the boards at New Orleans and San Francisco might well be noted, however, in view of the fact that both ports have been successfully operated. In each case the State board in charge of the port controls only one port, the jurisdiction of the San Francisco board being limited to the front within the limits of the city while that of the New Orleans board extends beyond the city and includes contiguous sections of adjoining parishes. Both boards own practically all of the water front under their jurisdiction and can secure possession of the sections they now lack, either by condemnation proceedings, as in the case of New Orleans, or by use, as in the case of San Francisco. Both boards are required to make their revenues pay the cost of

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improvements and operating expenses. Both boards have extensive powers, but the New Orleans board has authority to construct warehouses, while, apparently, the San Francisco board does not have such authority. The latter board has control of all the port facilities, including the harbor belt-line railroad, while the former board has no control of the belt line, which is under the control of a municipal commission. The members of the New Orleans board receive no compensation, while those of the San Francisco body are paid substantial salaries.

The present Board of Directors of the Port of Boston has been in operation too short a time to justify any comment as to the success of its form of organization and powers. It is interesting, however, to note that the board, as now constituted, consists of three members, all of whom are appointed by the governor, instead of five as formerly, three of whom were appointed by the governor and one by the mayor of Boston, while the fifth was the chairman of the board of harbor and land commissioners.

The independent port-authority type is new in the United States, although it has long been in successful operation in certain ports of Great Britain. Under this form of administration, a municipal corporation that is independent in every way of the municipal government of the port city is created by act of the legislature. Its jurisdiction may extend considerably beyond the limits of the city, as in the case of the port of Portland, Oreg., and the port of Seattle, or may be coterminous with the city, as in the cases of the boards of port commissioners of Jacksonville and Tampa. This governing body is vested with a wide scope of action and large powers, including the power of eminent domain and the power to raise funds by the sale of bonds and by tax levies not to exceed a fixed amount in any one year.

The powers and duties of the body governing the port of Portland, it should be noted, are limited to the improvement of the Willamette and Columbia Rivers from the city of Portland to the ocean and to a few other less important matters. They do not include the control and operation of the terminals at Portland, these terminals being managed by the commission of public docks, which is a department of the municipal government.

The port of Seattle commission was organized under the port district act, which was passed by the State legislature of Washington on March 14, 1911. This act provides for the creation of port districts by popular election in any county in the State, these districts to be wholly self-sustaining and independent of State, county, and municipal authorities and to be in charge of three or five members who are chosen by popular vote and serve without compensation. The term of service is three years and the terms are so arranged that only one member retires each year. Only two such districts have as yet been created, one in King County, of which Seattle is the county seat, and the other in Chehalis County, which includes Grays Harbor. No port district has been created in the county in which the port of Tacoma is situated.

In the case of the ports of Jacksonville and Tampa the governing body is known as the board of port commissioners. Both boards were created by the State legislature of Florida, the former in 1912 and the latter in 1913, and both are vested with the same powers,



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which are practically as extensive as those exercised by the port of Seattle commission. The chief point of difference between the boards in Florida is that the Jacksonville board has 15 members while the board at Tampa has only 7.

**Port charges.**—The system of port charges varies with the manner in which port facilities are operated. The four principal methods of operation in the United States have been well described in the following terms:*

1. The facilities may be largely controlled by the trunk-line railroads and by these railroads furnished gratis or at small expense to shipping. Boston, Philadelphia, Baltimore, and Norfolk are principally operated under this system.
2. The facilities may be leased for definite terms to steamship lines or railroads for fixed annual rentals, and, during such time, lessees have exclusive control of the space. The facilities in New York are almost wholly operated under this system.
3. The facilities may be open to all on practically the same terms whether constant or irregular use be made, the charges being fixed against individual ships for each use of the port. This has been the system in New Orleans, where the size of the ship determines the entire charge.
4. The facilities may be open to all on practically the same terms, the port revenues being obtained principally from tolls fixed by the nature and quantity of the cargo unloaded or loaded. Galveston, San Francisco, and Montreal are the principal examples of this method, although Galveston and San Francisco also fix a charge against the ship.

The first method prevails at almost all of the selected ports, that is, the port facilities are largely controlled by railroad companies which provide free dockage for ships and free wharfage for cargoes. Port terminals are generally regarded by the railroad companies as an integral part of their system and are considered to be as necessary to the operation of the road as freight yards or freight sheds. The cost of maintaining these terminals according to this view should be borne by the entire system, since they develop traffic for the road.

In recent years, however, the expense of acquiring additional tidewater terminals and of maintaining present terminals has made the extent of this burden apparent, and in view of the demands for enormous amounts of capital for other departments, railroad companies are showing a tendency to favor the development of publicly-owned port terminals. It is generally conceded that port facilities can be furnished at lower rates at publicly owned than at privately owned terminals for two reasons: First, because the public can borrow money at lower rates and, second, because the public facilities are not required to yield a profit.

In ports such as Boston, where the railroad companies have long provided extensive terminals that are free to ships and cargoes and are probably ample for the present needs of the commerce of the port, the difficulty of making newly-established public terminals self-sustaining seems almost insuperable. The situation at Boston is such that the practice of free dockage and wharfage at the railroad terminals must be abandoned or the railroad facilities must be acquired by the public or the State must be prepared to face a loss on cost of operation unless collateral sources of revenue, such as leases of water-front property for industrial purposes, should be developed.

An excellent solution for the problem faced by ports owning public terminals that must compete with railroad terminals at which no dockage or wharfage is charged has been suggested by Mr. G. B. Hegardt, engineer and secretary of the Portland, Oreg., Dock Com-

* Analysis of Present Operation of the Port of New Orleans; report made by Ford, Bacon, and Davis, engineers for the Board of Commissioners of the Port of New Orleans, p. 15.

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mission. In a paper read before the conference of port authorities of the Pacific coast, held in Seattle in June, 1914, Mr. Hegardt said:[a] "It is therefore obvious that this question of terminal charges and absorptions of the same is a broad and perplexing one, more particularly with reference to the operation of publicly-owned water terminals. It would appear that a successful solution could be brought about either by the railroads absorbing terminal charges on all docks, irrespective of ownership, or by so adjusting rail rates as to permit of a uniform system of assessing all of these charges on all docks."

The situation at Philadelphia and Baltimore is somewhat similar to that at Boston, although the terminals at the former cities appear to fill a lack in the facilities of those ports and have been leased at fair rentals. The public terminals at Philadelphia and Baltimore, however, are not yet self-sustaining, although the loss in maintenance and operation can be readily endured by the tax payers in view of the comparatively small deficit and of the many collateral advantages accruing to the city as a result of its possession of terminals.

The second system of operation described above is the prevailing method in those cities which have public terminals. The strain on the revenue-raising and bond-selling powers of most cities in the United States impels them to secure revenue from public port facilities at as early a date as practicable by leasing these facilities for long terms. In the case of New York the revenues of port operation greatly exceed the cost of operation, interest on bonds, and depreciation. Nevertheless, the surplus is not devoted to extending the public facilities of the port but is turned into the general funds of the city for the use of other municipal departments. New York is not content to have its port self-sustaining, but expects it to be a money-making public utility. The city is apt to take a purely parochial view of the situation, forgetting that it is truly a national port and that the high rentals received for its piers are, in the last analysis, a tax on the nation's business.

The third method, that of levying a charge against the ship and none against the cargo, is the method that has long been in vogue at the public terminals in New Orleans. According to the New Orleans system the charge for dockage varies with the tonnage of the ship and is the same whether the vessels remain 6 days or 36 days. The burden upon the vessel is so great that vessel owners have threatened to divert their ships to Galveston, a rival port, where the burden of port charges at the privately owned facilities of the Galveston Wharf Co. are borne by both the vessel and the cargo and where, therefore, the charge against the vessel is less than at New Orleans. The port of New Orleans has given careful study during the past year to the subject of a proper distribution of charges at a port that must be self-sustaining and seems likely to adopt a system similar to that which prevails at San Francisco, thus changing to the fourth method described above.

The fourth method of operation prevails at San Francisco and Galveston. At the former port the port facilities are largely controlled by the public; at the latter, by a private wharf company. The systems at both ports are similar in that, first, only the preferential and not the exclusive use of a pier is given to any steamship line or agent;

[a] Proceedings, p. 33.

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second, a charge or rent must be paid each time a vessel docks, the charge varying with the tonnage of the vessel at Galveston and with the length of vessel and the kind of pier occupied at San Francisco; and third, wharfage, in addition to dockage, charges are assessed on the cargo transferred over the pier.

A fifth method of operation might be added to those described above to cover those ports which make no charge against the vessel when receiving or discharging cargo but rely wholly upon wharfage charges as a source of revenue. Seattle and Portland, Oreg., are the principal examples of this method. By reason of the fact that no dockage charge is made against the vessel a tendency is noted to advertise Seattle as a "free port"—a new use of this term.

An interesting discussion of systems of port charges is to be found in the Proceedings of the Conference of Port Authorities of the Pacific Coast, which was held in Seattle in June, 1914.

A valuable study of port charges at six of the leading ports in the United States was made by Ford, Bacon, and Davis, engineers for the Board of Commissioners of the Port of New Orleans. This report includes a comparative estimate of port charges at New Orleans, Galveston, Mobile, Philadelphia, New York, and San Francisco on a vessel of a specified draft and tonnage and with a specified cargo. Because of the marked difference in wharfage rates, dockage charges, etc., satisfactory comparisons of port charges can be made only for a hypothetical ship and cargo. In this instance a ship that had docked at New Orleans and was typical of the class of ships and cargoes accommodated at that port was taken as a basis. The following facts regarding this ship and its inward-bound and outward-bound cargoes were used:

| | | |
|---|---|---|
| Description of vessel: Steam vessel in foreign trade. | | |
| Draft of vessel, inward | feet | 20 |
| Draft of vessel, outward | do | 24 |
| Total time in port | days | 14 |
| Time at public wharf | do | 7 |
| Time at railroad wharf | do | 7 |
| Time discharging cargo (no Sunday, night, or holiday work) | do | 5 |
| Time loading cargo (no Sunday, night, or holiday work) | do | 7 |
| Gross tonnage of vessel | | 5,154 |
| Net tonnage of vessel | | 3,279 |
| Dead-weight capacity of vessel | short tons | 6,473 |
| Cargo space | cubic feet | 351,760 |
| Inward cargo: | | |
| Kainit, in bulk | short tons | 967 |
| General cargo | do | 3,009 |
| Total | do | 3,976 |
| Outward cargo: | | |
| Cotton | do | 192 |
| Wheat | do | 1,680 |
| Provisions (including meats, canned goods, etc.) | do | 444 |
| Agricultural implements (knocked down and crated) | do | 109 |
| Feed | do | 992 |
| Flour | do | 605 |
| Mussel shells | do | 36 |
| Logs, lumber, and staves | do | 1,914 |
| Merchandise | do | 7 |
| Total | do | 5,979 |

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The following table shows the port charges computed on the above basis of facts that would have been levied on the hypothetical ship and cargo at the ports of Galveston, Mobile, Philadelphia, New York, and San Francisco, and, in addition, the charges actually assessed at New Orleans under the present system of rates:

| Item. | New Orleans. | Galveston. | Mobile. | Philadelphia. | New York. | San Francisco. |
|---|---|---|---|---|---|---|
| **Pilotage:** | | | | | | |
| Bar, inward | $80.00 | | | | | |
| River or channel, inward | 35.00 | $80.00 | $100.00 | $100.00 | $82.60 | $158.37 |
| Shifting from one berth to another within harbor | [a] 30.00 | [b] 10.00 | [b] 10.00 | | [b] 5.00 | |
| River or channel, outward | 42.00 | | | | | |
| Bar, outward | 96.00 | 96.00 | 144.00 | 120.00 | 85.44 | 170.37 |
| Total | 283.00 | 186.00 | 254.00 | 220.00 | 173.04 | 328.74 |
| **Towage:** | | | | | | |
| Assisting vessel to dock, inward | | 25.00 | 30.00 | 30.00 | 20.00 | 25.00 |
| Shifting from one berth to another within harbor | [a] 90.00 | [b] 50.00 | [b] 30.00 | [b] 45.00 | [b] 40.00 | [b] 50.00 |
| Assisting vessel from dock to river or channel, outward | 15.00 | 25.00 | 30.00 | 30.00 | 20.00 | 25.00 |
| Total | 105.00 | 100.00 | 90.00 | 105.00 | 80.00 | 100.00 |
| **Local port charges:** | | | | | | |
| Harbor fee | 15.00 | | | | | |
| Dockage of vessel | 463.86 | | 25.00 | 229.53 | (c) | 257.35 |
| Wharfage or shed charges to vessel | 77.31 | 175.00 | | | 1,050.00 | |
| Total | 556.17 | 175.00 | 25.00 | 229.53 | 1,050.00 | 257.35 |
| **Wharfage, or tolls on cargo:** | | | | | | |
| Inward cargo | | 994.00 | 843.55 | | | 198.80 |
| Outward cargo | | 1,378.50 | 669.02 | | | 396.57 |
| Total | | 2,372.50 | 1,512.57 | | | 595.37 |
| **Labor:** | | | | | | |
| Stevedore— | | | | | | |
| Discharging cargo | 1,479.70 | 1,573.48 | 1,376.85 | 1,199.35 | 1,340.00 | 1,597.50 |
| Loading cargo | [d] [e] 2,169.00 | [e] 2,058.64 | [e] 2,379.11 | 1,935.31 | 1,675.00 | 2,596.15 |
| Total | 3,648.70 | 3,632.12 | 3,755.96 | 3,134.66 | 3,015.00 | 4,193.65 |
| **Miscellaneous charges:** | | | | | | |
| Cotton inspection | 11.52 | 5.76 | 11.52 | | | |
| Local health or quarantine fee | | 10.00 | | 10.00 | 10.00 | .20 |
| Running lines for vessels | | 8.00 | 4.00 | 6.00 | 6.00 | |
| Other miscellaneous charges | | 7.68 | [f] 50.00 | | | |
| Total | 11.52 | 31.44 | 65.52 | 16.00 | 16.00 | .20 |
| RECAPITULATION. | | | | | | |
| Pilotage | 283.00 | 186.00 | 254.00 | 220.00 | 173.04 | 328.74 |
| Towage | 105.00 | 100.00 | 90.00 | 105.00 | 80.00 | 100.00 |
| Local port charges | 556.17 | 175.00 | 25.00 | 229.53 | 1,050.00 | 257.35 |
| Tolls on cargo | | 2,372.50 | 1,512.57 | | | 595.37 |
| Labor | 3,648.70 | 3,632.12 | 3,755.96 | 3,134.66 | 3,015.00 | 4,193.65 |
| Miscellaneous charges | 11.52 | 31.44 | 65.52 | 16.00 | 16.00 | .20 |
| Total expense, ship and cargo | 4,604.39 | 6,497.06 | 5,703.05 | 3,705.19 | 4,334.04 | 5,475.31 |

[a] Indicates three shifts.
[b] Indicates one shift.
[c] On account of physical limitations of purely public facilities, the ship is here assumed to spend entire 14 days at private wharves.
[d] Includes $168.80 overtime and night work.
[e] Because of the condition that Mobile ships only sacked wheat, the Mobile item includes $525 for loading 1,500 tons, at 35 cents per ton. New Orleans and Galveston figures, based on bulk wheat from elevators, include $70 and $89.60, respectively, for trimming only.
[f] Tarpaulin rental

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It should be noted that since the above computations were made pilotage rates at the port of San Francisco have been greatly reduced.

*Definitions of port charges.*—In the literature on the subject of port charges there is a considerable confusion in terms. This fact was specially emphasized by several speakers at the Conference of Port Authorities of the Pacific Coast held in Seattle June, 1914, and, as a result, the conference adopted standard definitions for many of the terms used in connection with port charges. They are as follows:

*Dockage.*—A charge against the vessel direct, based upon its net tonnage, or length, for the use of facilities furnished by the port.

*Wharfage.*—A charge against goods passing over the wharves furnished by the port.

*Demurrage.*—A charge in the form of penalty for delay beyond the prescribed time in removing goods from wharves.

*Rent.*—A charge for the use of wharves and sheds, to be assessed upon a square-foot basis and to be paid by the ship company having the assignment, irrespective of the vessel or cargo.

*Handling.*—The operation of moving goods across the wharves between ship's sling and rail or dray.

*Storage.*—A charge for goods held in the transit sheds or warehouses under fixed or special arrangements for periods of time beyond that considered in the term "wharfage."

*Assignment.*—An arrangement by which shipowners are given a privilege, temporary in character and revocable on short notice at the will of either party, to berth at the public wharves.

*Lease.*—An arrangement more or less permanent in character by which a wharf or other facility is turned over to shipowner or company for use as it sees fit, subject only to general port regulations.

*Ton.*—The basis of estimate of cargoes and vessel capacity and to be 2,000 pounds avoirdupois or 40 cubic feet measurement on articles definitely specified.

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# CHAPTER I.

## NORTH ATLANTIC PORTS.

### BOSTON, MASS.

Boston is the principal port on the Atlantic seaboard north of New York as well as one of the most important harbors in the United States. The harbor includes "all the expanse of tidewater lying within a line drawn from Point Allerton to Point Shirley, and extending from that line westward to the shores of the mainland. This comprises a surface area of about 30,000 acres, exclusive of the islands." [a]

The port of Boston has an outer and an inner harbor, as is indicated in the map shown opposite this page. The outer harbor consists principally of the main ship channel and anchorage grounds known as President Roads. The main ship channel has a width of 1,200 feet and a depth at mean low water of 35 feet. The mean range of tide is 9½ feet. The main ship channel is adjacent to the commercial water front of South Boston, the Atlantic Avenue water front of Boston proper, the main part of the East Boston water front, and the frontage at Charlestown, including that occupied by the United States navy yard, and extends into the Charles River as far as the Charlestown Bridge and into Chelsea Creek as far as the Meridian Street Bridge.

The principal terminals of the port are located on the main ship channel and are available for the larger vessels. These terminals include those of the State and of the New York, New Haven & Hartford Railroad in South Boston, those of the coastwise steamship lines in Boston proper, those of the Boston & Maine Railroad in Charlestown, and those of the Boston & Albany and of the National Dock & Storage Warehouse Co. in East Boston.

The inner harbor also is extensive and includes 11 rivers and tidal inlets. The following is a list of the rivers and estuaries leading into or from the main harbor, with the length and width of their improved channels in 1912: [b]

| Rivers and estuaries. | Length. | Width. | Rivers and estuaries. | Length. | Width. |
|---|---|---|---|---|---|
| Chelsea River: | *Feet.* | *Feet.* | Charles River: | *Feet.* | *Feet.* |
| Lower portion | 5,200 | 300 | Below dam | 2,500 | 50–300 |
| Upper portion | 5,600 | 100–150 | Above dam | 7,500 | 80–100 |
| Mystic River: | | | Millers River | 5,000 | 100–200 |
| South channel | 3,500 | 200–300 | Fort Point Channel: | | |
| North channel | 2,800 | 300 | Below Federal Street | 4,000 | 175 |
| Above New England Gas & Coke Co | 20,000 | 50–300 | South Bay | 6,500 | 75–100 |
| Malden River | 8,000 | 100 | Neponset River | 20,000 | 50–100 |
| | | | Weymouth Fore River | 30,000 | 50–300 |
| | | | Weymouth Back River | 20,000 | 150–200 |

[a] Report, Chief of Engineers, U. S. Army, 1914, p. 80.
[b] Report, Directors of the Port of Boston, 1914, p. 54.



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The principal sections of the inner harbor are Reserved Channel, Fort Point Channel, South Bay, the south channel of the Mystic River, and the lower portions of the Charles, Mystic, and Chelsea Rivers.

Reserved Channel is a channel dredged through the tide flats at South Boston and extending a distance of 1½ miles from the main channel. For a distance of 1¼ miles the channel has a width of 300 feet and a depth of 30 feet at mean low water.

Fort Point Channel lies between the eastern shore of Boston proper and the reclaimed and improved South Boston flats. It is about 1¼ miles in length and 175 feet wide and has a depth at mean low water of 23 feet as far as Dorchester Avenue Bridge, a distance of nearly three-quarters of a mile, and of 12 feet beyond the bridge, where it runs into South Bay.

South Bay runs into the heart of the city for about 1¼ miles and has a depth of 20 feet at mean low water.

The south channel of the Mystic River, which is now merely an arm of the main channel, has a depth at mean low water of 29 feet at the outer end and of 20 feet in the inner and larger section.

Charles River enters at the western end of the harbor and separates Boston proper from Charlestown. Only the lower one-half mile of this river is actively used.

Mystic River enters at the northern end of the harbor and is crossed near its mouth by the bridge that connects Charlestown and Chelsea. The improved channel in this river has a width of 300 feet and a depth at mean low water of 30 feet from the Chelsea Bridge to the mouth of Island End River, 2,700 feet above. Island End River has a dredged channel about 25 feet deep as far as the upper limit of the terminals of the New England Coal & Coke Co.

Chelsea River enters the north end of the harbor from the eastward and is crossed just above its mouth by the bridge connecting East Boston with Chelsea. The main ship channel extends as far as this bridge. For a distance of three-quarters of a mile above the bridge the river has a depth of 18 feet at mean low water.[a]

**Railroads.**—Boston is served by the Boston & Albany, the Boston & Maine, and the New York, New Haven & Hartford Railroads, whose terminals are located, respectively, on the northwest, the north, and the south sides of the harbor.

The port of Boston has no complete belt or marginal railway serving the harbor terminals. The Grand Junction branch or division of the Boston & Albany and the Union Freight Railroad, which is owned by the New York, New Haven & Hartford Railroad, perform to a limited extent the functions of such a railway. The Grand Junction division serves the East Boston terminals of the Boston & Albany and connects them with the Charlestown terminals of the Boston & Maine.

The Union Freight Railroad runs along Atlantic Avenue in Boston proper and connects with the Boston & Maine at North Station and with the New York, New Haven & Hartford and the Boston & Albany near South Station. In this way it connects these two railroads with each other as well as with the several piers on the Atlantic Avenue water front. There is, however, little interchange of freight between the larger railroads over the tracks of the Union Freight Railroad.

[a] Condensed from Report of Chief of Engineers, U. S. Army, 1914, p. 80.

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The total tonnage carried by this road in 1912 was about 400,000 tons, the major portion consisting of commodities for the markets and other concerns in the Atlantic Avenue district. Since 1912 the traffic of this road has increased more than one-third, the increase being due largely to traffic developed by the new State pier.

Although strategically located, the Union Freight Railroad is inadequate as a harbor-terminal railway, since it is located in a crowded public thoroughfare and can interchange cars with other railroads only during the night. It has been suggested that the efficiency of this road might be greatly increased if its tracks were extended over Northern Avenue Bridge, which was built mainly for this purpose. Such an extension would provide a direct connection with the new State terminals and those of the New York, New Haven & Hartford Railroad in South Boston.

The question of an inner and an outer belt-line railway for the port has been carefully investigated by the port directors at the direction of the State legislature. The directors found, among other things, that (1) the construction of a new outer belt line was not required by the needs of the port itself; (2) a complete inner belt railroad to connect all piers with all railroads was not practicable; and (3) the extension of the Union Freight Railroad over Northern Avenue Bridge and the establishment of a proper car-floating service between the Mystic Wharf of the Boston & Maine at Charlestown and the South Boston terminals of the New York, New Haven & Hartford at South Boston would furnish an economical and expeditious means of interchange for both the foreign and the local business of the two railroads.[a]

**Steamship lines.**—The following is a list of the principal lines of steamships engaged in the foreign trade that called at the port of Boston during the fiscal year ended November 30, 1914, together with the berth occupied by each and the number of sailings during the year:[b]

| Lines and services. | Berths. | Sailings. |
|---|---|---|
| Allan Line to Glasgow [c] | Mystic terminal of Boston & Maine R. R., Charlestown. | 22 |
| American and Cuban Line from Calcutta and East Indies. | American Sugar Refining Co., South Boston | 8 |
| American and Indian Line from Calcutta and East Indies. | Mystic terminal of Boston & Maine R. R., Charlestown. | 44 |
| America and Levant Line from Smyrna, Turkey, etc. | do | 2 |
| American and Manchurian Line from the Far East. | do | 3 |
| American and Oriental Line from China and Japan. | do | 30 |
| Austro-Americana Line from Trieste and Adriatic and Italian ports. | New York, New Haven & Hartford R. R. terminal, South Boston. | 8 |
| Barber Line from South American ports | National Docks & Storage Warehouse Co., East Boston. | 12 |
| Chalk Line from London | Mystic terminal of Boston & Maine R. R., Charlestown. | 5 |
| Clay Line from Fowey, England | do | 11 |
| Clyde-Santo Domingo Line from Santo Domingo. | Hoosac terminal and the Boston & Maine R. R. terminal, Charlestown, and the Boston & Albany, East Boston. | 8 |
| Cunard Line to Liverpool [c] | Boston & Albany R. R. terminal, East Boston | 22 |
| Eastern Steamship Corporation, International Line to St. John, New Brunswick. [c] | Central Wharf, Atlantic Avenue, city proper | 149 |
| Eastern Steamship Corporation, Yarmouth Line to Yarmouth, Nova Scotia. [c] | do | 177 |

[a] Report of the Directors of the Port of Boston upon the Use of Water Terminals and Railroad Connections, January, 1914 (Mass. H. Doc. No. 2091).

[b] Report of the Directors of the Port of Boston for the year ended Nov. 30, 1914, pp. 177–178

[c] Carries passengers as well as freight.

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| Lines and services. | Berths. | Sailings. |
|---|---|---|
| Federal and Shire Line from New Zealand and Australia. | Boston & Albany R. R. terminal, East Boston.. | 5 |
| German and Australian Line from Australia.... | Mystic terminal of Boston & Maine R. R., Charlestown. | 2 |
| Hamburg-American Line to Hamburg[a]..... | Commonwealth Pier No. 5, South Boston..... | 24 |
| Havana Line to Havana..... | Mystic terminal of Boston & Maine R. R., Charlestown. | 13 |
| Holland-America Line from Rotterdam..... | ....do..... | 24 |
| Houston Line from South American ports..... | National Docks & Storage Warehouse Co., East Boston. | 23 |
| Italian lines to the Mediterranean[a]..... | Boston & Albany R. R. terminal, East Boston.. | 5 |
| Leyland Line to Liverpool[a]..... | ....do..... | 36 |
| Leyland Line to Manchester..... | ....do..... | 20 |
| Leyland & Wilson's and Furness-Leyland lines to London. | Hoosac terminal of Boston & Maine R. R., Charlestown. | 26 |
| Munson Line from Cuban ports..... | American Sugar Refining Co., South Boston.... | 26 |
| Norton Line from South American ports..... | National Docks & Storage Warehouse Co., East Boston. | 1 |
| North German Lloyd Line from Bremen[a]..... | Boston & Albany R. R. terminal, East Boston.. | 14 |
| Plant Line to Halifax, Nova Scotia[a]..... | Commercial Wharf, Atlantic Avenue, city proper | 67 |
| Porto Rico Line from Porto Rico..... | American Sugar Refining Co., South Boston.... | 5 |
| Red Star Line from Antwerp[a]..... | Hoosac terminal of Boston & Maine R. R., Charlestown. | 20 |
| Russian-America Line from Libau..... | Mystic terminal of Boston & Maine R. R., Charlestown. | 1 |
| Scandinavian-American Line to Copenhagen.... | Hoosac terminal of Boston & Maine R. R., Charlestown. | 27 |
| Spanish American Line from Barcelona, Almeria, Huelva, etc. | New York, New Haven & Hartford R. R. terminal, South Boston. | 15 |
| Sweden-Norway Line from Goteborg and Christiania.[a] | Hoosac terminal of Boston & Maine R. R., Charlestown. | 11 |
| United Fruit Line to Havana and Central America. | Long Wharf, Atlantic Avenue, city proper..... | 52 |
| United Fruit Line from West Indies..... | ....do..... | 90 |
| Warren Line to Liverpool[a]..... | Hoosac terminal of Boston & Maine R. R., Charlestown. | 24 |
| White Star Line to Liverpool[a]..... | Commonwealth Pier No. 5, South Boston..... | 17 |
| White Star Line to the Mediterranean[a]..... | ....do..... | 13 |
| Wilson Line from Hull[a]..... | Mystic terminal of Boston & Maine R. R., Charlestown. | 26 |

[a] Carries passengers as well as freight.

The following is a list of the principal coastwise lines, with berths occupied and the number of sailings during the year ended November 30, 1914:

| Lines and services. | Berths. | Sailings. |
|---|---|---|
| American-Hawaiian Line to Pacific Coast ports (new). | New York, New Haven & Hartford Railroad terminal, South Boston. | 7 |
| Boston and Gloucester Line to Gloucester, Mass.[a] | Central Wharf, Atlantic Avenue, city proper.... | 396 |
| Boston-Pacific Line to Pacific Coast ports (new). | Terminal Wharf & Railroad Warehouse Co., Charlestown. | 3 |
| Clyde Line to Charleston, S. C., and Jacksonville, Fla. | Lewis Wharf, Atlantic Avenue, city proper..... | 71 |
| Eastern Steamship Corporation, Bangor Line to State of Maine ports.[a] | India Wharf, Atlantic Avenue, city proper..... | 234 |
| Eastern Steamship Corporation, International Line to State of Maine ports. | Central Wharf, Atlantic Avenue, city proper.... | 149 |
| Eastern Steamship Corporation, Kennebec Line to State of Maine ports.[a] | Foster's Wharf, Atlantic Avenue, city proper.. | 132 |
| Eastern Steamship Corporation, Metropolitan Line to New York.[a] | India Wharf, Atlantic Avenue, city proper..... | 117 |
| Eastern Steamship Corporation, Metropolitan Line to New York.[a] | Union and India Wharves, Atlantic Avenue, city proper. | 195 |
| Eastern Steamship Corporation, Portland Line to Portland, Me.[a] | Central Wharf, Atlantic Avenue, city proper.... | 310 |
| Lynn and Boston Line to Lynn, Mass..... | Commercial Wharf, Atlantic Avenue, city proper | 312 |
| Maine Coast Line to State of Maine ports..... | Long Wharf, Atlantic Avenue, city proper..... | 37 |
| Merchants & Miners' Line to Baltimore, Md., and Norfolk, Va.[a] | New York, New Haven and Hartford Railroad terminal, South Boston. | 156 |
| Merchants & Miners' Line to Philadelphia[a]..... | .....do..... | 156 |
| Merchants & Miners' Line to Norfolk, Va.[a]..... | .....do..... | 156 |
| Savannah Line to Savannah, Ga..... | Lewis Wharf, Atlantic Avenue, city proper..... | 111 |

[a] Carries passengers as well as freight.

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The following lines operate to points in the harbor or the bay and occupy berths at piers on the Atlantic Avenue water front: Bass Point and Nahant Line, Otis Wharf; Cape Cod Steamship Co., Bay Line Wharf; and Nantasket Steamship Co., Rowes Wharf.

**Commerce of the port.**—Complete data as to the total volume of water-borne commerce handled at the port of Boston are not available. The difficulty of securing complete commercial statistics for this port is apparently so great that no serious attempt is made to compile them.

The value of the foreign trade of the port is ascertainable from the trade statistics published by the Bureau of Foreign and Domestic Commerce, but facts as to the coastwise trade are known only for coal, cotton, and lumber, which form a large proportion of the tonnage but only a small part of the value of the coastwise shipping.

In the fiscal year ended June 30, 1913, the value of the foreign trade of the Boston and Charlestown customs district was $216,152,108, the imports being valued at $146,599,451 and the exports at $69,552,657. In that year the port of Boston ranked fourth among the ports of the country in respect to value of foreign trade, only New York, Galveston, and New Orleans showing a larger value.

The principal foreign imports and their respective values in 1913 and 1914 were as follows:

| Commodities. | 1913 [a] | 1914 [b] |
|---|---|---|
| Hides and skins | $24,833,246 | $24,266,438 |
| Cotton, unmanufactured | 18,779,858 | 11,483,830 |
| Wool, unmanufactured | 17,978,702 | 31,556,637 |
| Fiber, vegetable and textile grasses, unmanufactured | 10,413,736 | 14,349,595 |
| Burlaps or plain woven fabrics | 9,182,591 | 9,444,023 |
| Sugar, cane | 9,039,676 | 7,001,434 |
| Wood pulp | 2,697,439 | 2,886,063 |

[a] For Boston and Charlestown only. [b] For the entire State of Massachusetts.

An extension of the list of imports would emphasize the fact that the imports at Boston are largely raw or partially manufactured materials for use in the cotton and woolen mills, in leather and shoe factories, and in the plants of other important industries in New England.

The principal exports and their respective values in 1913 and 1914 were as follows:

| Commodities. | 1913 [a] | 1914 [b] |
|---|---|---|
| Meat products | $14,815,461 | $17,144,732 |
| Cotton, unmanufactured | 10,189,609 | 6,573,813 |
| Breadstuffs | 5,711,523 | 5,686,041 |
| Iron and steel: | | |
| Machinery, and parts of | 3,211,015 | 2,977,381 |
| Other manufactures of | 2,745,903 | 1,851,555 |
| Cotton, manufactures of | 4,754,344 | 4,545,426 |

[a] For Boston and Charlestown only. [b] For the entire State of Massachusetts.

The raw, or unmanufactured, cotton exported from the port of Boston is, of course, of domestic production. There is a large movement of raw cotton from ports in the Southern States to Boston, the great bulk of which is taken by the textile mills of New England.

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The surplus over domestic requirements supplies bulk cargo for ships to Europe. Shipments from Boston to European ports, as a rule, lack bulk. Cotton largely supplies this lack, and a low freight rate is, therefore, made on cotton exported from Boston.

As stated above, complete statistics of the coastwise trade at the port of Boston are not available, but data relating to the coastwise movement of coal, cotton, and lumber are at hand.

Boston is undoubtedly the leading coal-receiving port in the United States. Large fleets of vessels ply regularly between Boston and Newport News, Norfolk, Baltimore, Philadelphia, Perth Amboy, and other coal-shipping points. The industries of Massachusetts owe much to their ability to get fuel by water through the port of Boston.

In the calendar year 1913, 5,892,928 short tons of bituminous coal and 2,077,068 tons of anthracite were received at Boston. All the bituminous coal except 52,860 tons and all of the anthracite except 199,516 tons were received by sea. It is interesting to note that while the receipts of anthracite have remained practically stationary since 1897 the receipts of bituminous coal have increased about 200 per cent.

The following table shows the quantity of anthracite and bituminous coal received in the calendar year 1913 from the principal shipping ports:[a]

| Ports of shipment. | Short tons. | Ports of shipment. | Short tons. |
|---|---|---|---|
| BITUMINOUS COAL. | | ANTHRACITE—continued. | |
| Norfolk, Va | 2,783,961 | Port Johnson, N. J | 189,567 |
| Baltimore, Md | 1,295,653 | New York, N. Y | 162,183 |
| Newport News, Va | 826,165 | Perth Amboy, N. J | 158,800 |
| Philadelphia, Pa | 620,002 | Undercliffe, N. J | 131,342 |
| Louisburg, Nova Scotia | 295,878 | Edgewater, N. J | 120,710 |
| All other | 18,409 | Hoboken, N. J | 118,707 |
| | | South Amboy, N. J | 45,503 |
| Total | 5,840,068 | Elizabethport, N. J | 34,137 |
| ANTHRACITE. | | Cornwall, N. J | 30,010 |
| | | All other | 21,253 |
| Philadelphia, Pa | 652,045 | Total | 1,877,468 |
| Guttenberg, N. J | 213,211 | | |

The receipts of cotton at the port of Boston are large. Of the 530,628 bales received during the calendar year 1913, 501,993 bales were brought by vessels. The number of bales received by steamers from the several ports is indicated in the following tabular statement:[b]

| Ports of shipment. | Bales. | Ports of shipment. | Bales. |
|---|---|---|---|
| Savannah | 225,496 | Galveston | 10,050 |
| New York | 120,648 | Jacksonville | 8,864 |
| Norfolk | 76,830 | Baltimore | 1,478 |
| Newport News | 36,562 | | |
| Charleston | 22,065 | Total | 501,993 |

The following tabular statement shows the quantity of lumber received at Boston during the calendar year 1913, classified by route and general origin:[c]

[a] Annual Statistical Report of the Boston Chamber of Commerce, 1914, pp. 66–68.
[b] Idem, pp. 61–62.
[c] Idem, p. 63.

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| Route and origin. | Quantity. |
|---|---|
| By sea: | |
| Domestic— | *Feet b. m.* |
| Eastern ports | 25,904,933 |
| Southern ports | 129,976,832 |
| Total | 155,881,765 |
| Foreign | 55,646,431 |
| Total | 211,528,196 |
| By rail | 141,163,000 |
| Grand total | 352,691,196 |

Some idea of the extent of shipping in Boston Harbor is given also by the following table, which shows the number of ships, with their register tonnage, that entered and cleared in 1913:

| Class of vessels. | Arrivals. | | Departures. | | Total. | |
|---|---|---|---|---|---|---|
| | Number. | Tonnage. | Number. | Tonnage. | Number. | Tonnage. |
| FOREIGN COMMERCE. | | | | | | |
| American steamships | 128 | 231,290 | 108 | 203,649 | 236 | 434,939 |
| American sailing vessels | 60 | 11,197 | 71 | 22,822 | 131 | 34,019 |
| Foreign steamships | 961 | 2,868,631 | 676 | 1,851,324 | 1,637 | 4,719,955 |
| Foreign sailing vessels | 259 | 42,079 | 266 | 46,493 | 525 | 88,572 |
| Total | 1,408 | 3,153,197 | 1,121 | 2,124,288 | 2,529 | 5,277,485 |
| DOMESTIC AND COASTWISE COMMERCE. | | | | | | |
| Steamships | 3,338 | 7,690,714 | 3,338 | 7,690,714 | 6,676 | 15,381,428 |
| Sailing vessels | 1,180 | 815,173 | 1,180 | 815,173 | 2,360 | 1,630,346 |
| Tugs | 2,491 | 704,426 | 2,491 | 704,426 | 4,982 | 1,408,852 |
| Barges | 3,564 | 3,164,351 | 3,564 | 3,164,351 | 7,128 | 6,328,702 |
| Total | 10,573 | 12,374,664 | 10,573 | 12,374,664 | 21,146 | 24,749,328 |

**Extent and ownership of water front.**—The port of Boston has 141 miles of water front including a lineal frontage of more than 40 miles of berthing space, of which more than 8 miles fronts on a depth of 30 feet at mean low water.

The State of Massachusetts owns the water front of the South Boston flats east of the piers and freight yard of the New York, New Haven & Hartford Railroad, the frontage occupied by the old Eastern Railroad pier in East Boston, a large area of flats to the north and east of Jeffries Point in East Boston, Bird Island Shoal, and all the water area of the harbor below the line of riparian ownership.

The area and the assessors' valuation of the several tracts owned by the State are given in the Report of the Directors of the Port of Boston for 1914, as follows:

| Tracts. | Area. | Assessors' valuation. |
|---|---|---|
| | *Acres.* | |
| South Boston flats | 435.00 | $8,058,001 |
| East Boston flat | 658.99 | 480,700 |
| Bird Island flats | 122.82 | (a) |
| Eastern R. R. pier property | 10.70 | 691,500 |
| Total | 1,227.51 | [b] 9,230,201 |

[a] Has no assessed valuation, having been acquired from the city of Boston.
[b] Not including value of Bird Island Flats.

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The following table shows the area of filled land, of docks, of pile wharves with flats underneath, and of flats located at South Boston and owned by the State:

| Items. | Leased. | Available for disposal. | Occupied by State. | Total. |
|---|---|---|---|---|
| | *Sq. feet.* | *Sq. feet.* | *Sq. feet.* | *Sq. feet.* |
| Filled land | 1,469,651 | 3,772,500 | 1,795,550 | 7,037,701 |
| Docks | 1,140,000 | ..... | 408,000 | 1,548,000 |
| Pile wharves with flats underneath | 101,700 | ..... | 135,000 | 236,700 |
| Flats | 428,000 | 1,754,500 | 7,944,000 | 10,126,500 |
| Total | 3,139,351 | 5,527,000 | 10,282,550 | 18,948,901 |

The city of Boston owns and occupies a large amount of water-front property in various sections of the harbor. Most of this property fronts on the shallower channels in the inner harbor and is not at present valuable for commercial purposes; in fact, most of this frontage is used for parks.

**Terminals.**—The State owns two piers, Commonwealth Pier No. 5 and Commonwealth Pier No. 6. Both piers are located on the South Boston water front and adjoin the terminals of the New York, New Haven & Hartford Railroad.

Pier No. 5 is 1,200 feet long and 400 feet wide and has a depth alongside of 40 feet at mean low water. This pier has three large two-story fireproof sheds of steel-and-concrete construction. Six railroad tracks, four of which are depressed, run the entire length of the pier. The pier sheds are equipped with eight large freight and passenger elevators and a large number of electric winches for handling freight. The second story of the central shed is fitted up exclusively for handling passengers from ships on either side of the pier. The west half of this pier is assigned to the Hamburg-American Line and the east side to the White Star Line.

Pier No. 6, which is also known as the Fish Pier, is 1,200 feet long and 300 feet wide and has a depth alongside of 23 feet at mean low water. This pier has been leased to the Boston Fish Market Corporation for a period of 45 years from October 1, 1913. Under the terms of the lease the corporation agreed in invest in plant and buildings at least $1,000,000 and has erected an administration building, two long three-story buildings for individual fish shops, and a refrigerating and power plant. The corporation also agreed to pay as rental $35,000 a year during the first 15 years and $45,000 a year during the next 15 years. The Boston Fish Market Corporation moved to this pier on April 6, 1914, from its former location on T Wharf on the Atlantic Avenue water front.

The directors of the port are now engaged in the construction of a dry dock which will be the largest in the Western Hemisphere. This dock will be 1,200 feet long and 133 feet wide at the entrance, with 35 feet of water over the sill at mean low water. It is to be located on the Commonwealth Flats in South Boston on a rock ledge at the mouth of Reserved Channel and not far from the State piers. Bulkheads inclosing the site have been put in and have been filled with material obtained from dredging Reserved Channel. Thirty-five acres of flats have been reclaimed within the bulkheads, which will provide

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not only space for shops and other buildings used in connection with the dry dock but also about 5,000 feet of wharf frontage.

Before work on the dry dock was started the directors of the port entered into an agreement with the Cunard Steamship Co., the Hamburg-American Steamship Co., and the International Mercantile Marine Co., whereby these companies are to have preferential use of the dock under certain conditions and are to pay $50,000 annually for 20 years in lieu of dock dues whether they use the dock or not.

The former directors of the port planned to erect a pier in East Boston. They acquired the Eastern Railroad Pier property, which adjoins the Boston & Albany Railroad terminal and has an area of 473,600 square feet. The directors then in office planned to replace the old wooden pier and shed with a modern pier 900 feet long, but nothing has been done beyond removing the old structures.

Four of the docks owned by the city of Boston are used as slips for the East Boston Ferry, two being located at the Atlantic Avenue water front and two in East Boston. These frontages are valuable, as are also the spaces occupied by North End Park and the North End paving wharf in Boston proper at the mouth of the Charles River.

Ten parcels of water-front property owned by the city are used for park and recreation purposes. Several of these tracts are large and have an extensive frontage. Fourteen tracts, including the North End paving wharf, are used by the street, water, sanitary, charities, and other departments of the city government.

*Railway terminals.*—The principal terminals in Boston Harbor are owned by the Boston & Albany, the Boston & Maine, and the New York, New Haven & Hartford Railroads and by the State. The railroad companies have extensive holdings of water-front property and are the dominant factors in the port situation. The railroad terminals are located on three peninsulas and for practical purposes are as separate as if they were in three distinct communities.

The terminals of the New York, New Haven & Hartford Railroad Co. are located on the South Boston peninsula and front on the main ship channel and the Fort Point Channel. Although this frontage is very valuable, the terminals are used to a comparatively small proportion of their capacity. Much of this valuable property is used as a freight yard, which might better be located inland. These terminals are not actively used, since, apparently, the New Haven Railroad is not greatly interested in the development of export terminals at Boston. It should be noted, however, that this property came into the possession of the New Haven system as an incident of its acquisition of the New England Railroad, which was an export road.

The following is a list of the piers owned by the New York, New Haven & Hartford Railroad, with the dimensions of each: No. 1, length 770 feet, width not reported; No. 2, length 800 feet, width 250 feet; No. 4, length 1,050 feet, width 170–220 feet. Pier No. 1 fronts on the main ship channel and Fort Point Channel, and is separated from Pier No. 2 by a slip.

Another pier, known as Pier No. 3, consists of a landing stage used by car floats in transferring freight between the Mystic terminals of the Boston & Maine Railroad at Charlestown and the South Boston freight yard of the New Haven Railroad.

The New Haven Railroad occupies, under a long-term lease, a property fronting on Fort Point Channel and adjacent to Pier No. 1, known

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as the Atlas Stores property. This tract has a wharf frontage of 626 feet and an area of about 113,000 square feet. It has sheds along the water front and in the rear there are six 6-story brick warehouses with 154,560 square feet of floor space.

The New Haven Railroad controls, under lease from the South Bay Wharf & Terminal Co., most of the frontage on South Bay, which is a continuation of Fort Point Channel, and is, with the exception of the ship channel, very shallow. Five wharves located at the head of South Bay have, however, a depth alongside of 8 feet at mean low water.

The Boston & Maine Railroad has two water-terminal properties, which are generally referred to as the Hoosac Tunnel Docks and the Mystic Wharves. Both are located on the Charlestown peninsula, the Hoosac Tunnel Docks fronting on the main ship channel at the entrance of the Charles River, while the Mystic Wharves front on the main ship channel at the entrance of the Mystic River, on the south channel of the Mystic River, and on the Mystic River proper.

The Hoosac Tunnel terminals have an area of 20.38 acres and include five freight sheds with an area of 555,867 square feet, a grain elevator of 1,000,000 bushels capacity, and five piers and docks with the following dimensions:

| Piers. | Length. | Width. | Piers. | Length. | Width. |
|---|---|---|---|---|---|
| | *Feet.* | *Feet.* | | *Feet.* | *Feet.* |
| No. 40 | 310 | 345 | No. 43 | 500 | 440 |
| No. 41 | 500 | 345 | No. 44 | 630 | 440 |
| No. 42 | 500 | 150 | | | |

The Mystic Wharves have an area of approximately 86 acres and include five freight sheds with an area of 368,062 square feet, a grain elevator of 500,000 bushels capacity, extensive coal pockets, and seven wharves with the following frontages:

| Wharves. | Length. | Wharves. | Length. |
|---|---|---|---|
| | *Feet.* | | *Feet.* |
| No. 45 | 2,400 | No. 48 | 580 |
| No. 46 | 900 | No. 49 | 356 |
| No. 46½ | 170 | No. 50 | 420 |
| No. 47 | 910 | | |

Wharves Nos. 45 and 46 front on the south channel of the Mystic River. Wharf No. 45 lies above a drawbridge and has a depth alongside of only 20 feet at mean low water.

At the end of the peninsula between the south channel and the main channel of the Mystic River is a wharf with 170 feet of frontage that, for convenience in reference, has been designated as Wharf No. 46½.

These terminals are commonly called piers, but, since they are parallel to the channel, they are referred to as wharves in this report.

In addition to the wharves enumerated above there is a stretch of 2,250 feet of wharf front on the Mystic River proper above a drawbridge. This frontage is used as a coal wharf and has extensive coal pockets.

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The Boston & Albany Railroad terminals are located on the East Boston peninsula and have an area of more than 40 acres. These terminals include six warehouses, a grain elevator of 1,017,190 bushels capacity, and five piers with the following dimensions:

| Piers. | Length. | Width. | Piers. | Length. | Width. |
|---|---|---|---|---|---|
| | *Feet.* | *Feet.* | | *Feet.* | *Feet.* |
| No. 2 | 610 | 200 | No. 5 | 460–620 | 29–102.5 |
| No. 3 | 610–781 | 240 | No. 6 | 568 | 51 |
| No. 4 | 777 | 240 | | | |

Formerly there was a Pier No. 1, which was held under lease by the Boston & Albany Railroad Co. This pier, which was known also as the Eastern Railroad Pier, was purchased by the directors of the port in 1913 and was afterwards removed.

The directors of the port state that "with the exception of the business at Commonwealth Pier 5, nearly all of the foreign trade is now conducted at terminals owned by railroad companies who give the use of their wharves free of charge to the steamships."[a]

The volume of import and export trade handled at the terminals of the three railroads in 1911, 1912, 1913, and 1914 is reported by the port directors to have been as follows:

| Years. | Imports. | Exports. | Total. |
|---|---|---|---|
| | *Tons.* | *Tons.* | *Tons.* |
| 1911 [a] | 956,590 | 770,770 | 1,727,360 |
| 1912 [b] | 908,072 | 1,008,140 | 1,916,212 |
| 1913 [c] | 1,154,137 | 1,376,853 | 2,530,990 |
| 1914 [c] | 973,032 | 848,112 | 1,821,144 |

[a] Includes import and export traffic for the Boston & Albany and the Boston & Maine Railroads and import traffic only for the New York, New Haven & Hartford Railroad.
[b] Includes import and export traffic for all three railroads.
[c] Includes import and export traffic for the Boston & Albany and the Boston & Maine Railroads.

Not only do the railroads own the most important terminals at the port of Boston and largely control the foreign trade of the port, but they also have a considerable influence on the development of the State terminals, both because of the inadequate facilities for interchange of traffic between the several railroad terminals as well as between the railroad and the State terminals and because of their practice of giving free wharfage and free handling and of absorbing switching charges on through traffic.

In the matter of switching charges, the following statement from a special report of the directors of the port will be illuminating:

> In cases where goods arrive over one railroad for export at the terminal of another, or are imported at the terminal of one road for interior shipment over another, then in either case the railroad owning the terminal makes a charge to the other road for its services in switching the car to or from its terminal, which charges include also the loading or unloading of the car and the use of the wharf.
>
> On export carload freight the road which is so assessed usually absorbs into its Boston rate this switching charge in the case of export freights beyond New England, excepting grain from American points and grain and grain products from Canadian points.

[a] Report of the Directors of the Port of Boston upon the use of Water Terminals and Railroad Connections, January, 1914 (Mass. H. Doc. No. 2091), p. 5.



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On import carload freight, as a general rule, the switching charge assessed on import freight received at the piers of one railroad and shipped over the rails of another is not absorbed in the rate.

The result is that for points beyond New England, while the rates to or from all the piers in the harbor are the same, the import business of a steamship line to such points is confined to the railroad at whose pier the steamer docks. For New England points, however, the rates between points on any one of the railroads and the piers owned by that railroad are lower by the amount of the switching charge than the rates between such points and the other railroad piers. The practical result is that a steamship line docking at the Boston & Albany terminal is shut out of the business of Boston & Albany local territory.[a]

*Steamship terminals.*—A number of important terminals are located in the Atlantic Avenue water front in Boston proper. These are really piers although they are known as wharves, and they are used largely by the coastwise shipping of the port. Reference to the table on page 42 containing a list of coastwise lines and their berths shows that 11 of the 16 lines dock at wharves on the Atlantic Avenue water front.

Because of their proximity to the wholesale business and market district of the city these piers are, on the whole, more valuable as real estate than as water terminals, hence many of them are laid out like thoroughfares with rows of buildings for stores or for industrial purposes on either side. Their use for water-borne commerce appears to be merely incidental. These piers are among the oldest in Boston and many were built in the days of sailing vessels or when the steamships were smaller than they are to-day. Many of the piers are, therefore, too short and the slips between many of them too narrow for the use of large vessels.

The construction of modern terminals in this section of the harbor would be a large undertaking. To provide berths of sufficient size for the large vessels of the present day it would be necessary to tear out a number of piers and to remove many valuable buildings, and this could be done only at a cost that would be practically prohibitive.

Most of the Atlantic Avenue water front is held by trust estates and is leased to steamship companies. As indicated in the tables on pp. 41 and 42, the Union, India, Central, and Foster's Wharves are used by the several lines of the Eastern Steamship Corporation; Long Wharf by the Maine Coast Line and by the United Fruit Co. steamers; Lewis Wharf by the Clyde Line and the Savannah Line; and Commercial Wharf by the Lynn & Boston Line and by the Plant Line of steamers to Halifax. The Boston & Gloucester Line uses Central Wharf, which is occupied also by the Eastern Steamship Corporation. Otis Wharf, Bay Line Wharf, and Rowes Wharf are used, respectively, by the Bass Point & Nahant Line, the Cape Cod Steamship Co., and the Nantasket Steamship Co., which operate excursion lines to near-by points during the summer season.

Fiske's Wharf, Constitution Wharf, and Battery Wharf were formerly used by the Merchants & Miners' Transportation Co. for its lines to Baltimore, Norfolk, and Philadelphia. The vessels of this company now use the New York, New Haven & Hartford Railroad terminals in South Boston. These terminals are used also by one other coastwise line, the American-Hawaiian Steamship Co.

[a] Report of the Directors of the Port of Boston upon the Use of Water Terminals and Railroad Connections, January, 1914 (Mass. H. Doc. No. 2091), pp. 5-6.

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T Wharf was for many years the center for the fishing industry. Since April 6, 1914, when the Boston Fish Market Corporation moved to Commonwealth Pier No. 6, at South Boston, this wharf has been used comparatively little by the fishing boats.

*Wharf and dock companies' terminals.*—Important sections of the water front are held by dock and wharf and warehouse companies, the most important being the Boston Wharf Co., the National Dock & Storage Warehouse Co., and the Terminal Wharf & Railroad Warehouse Co.

The Boston Wharf Co. owns practically the entire south side of Fort Point Channel from Northern Avenue Bridge to Dorchester Avenue Bridge. This frontage includes the Atlas Stores property, occupied under long-term lease by the New Haven Railroads, as well as frontage leased to the American Sugar Refining Co., the Great Northern Paper Co., and other corporations.

The National Dock & Storage Warehouse Co. has an extensive water-front property in East Boston adjoining the Eastern Railroad Pier property acquired by the State from the Boston & Albany Railroad. In fact, a part of the dock company's property was also acquired by the State at the same time. The tract owned by the company has an area of about 600,000 square feet and has 62 buildings used for storage and wharfage purposes. The water front has two piers, 600 feet and 750 feet in length, respectively. These piers are used by the vessels of the Barber Line, Houston Line, and Norton Line, all of which are engaged in the South American trade.

The Terminal Wharf & Railroad Warehouse Co. has a wharf 150 feet wide and 800 feet long adjoining the Mystic Wharves terminal of the Boston & Maine Railroad. Two sides of this property front on the Mystic River, 150 feet having a depth alongside of 30 feet and 800 feet having a 27-foot depth alongside.

Other dock and wharf companies on the water front include the State Wharf & Storage Co. and the Federal Wharf & Storage Co. in East Boston, whose properties are used largely for the lumber business, and the Mystic Wharf & Storage Co., which has a wharf on the Mystic River in Charlestown.

*Coal terminals.*—Coal wharves and piers are among the most active in the harbor, the most important being those of the New England Gas & Coke Co., the Metropolitan Coal Co., the Boston Elevated Railway Co., the Philadelphia & Reading Coal & Iron Co., the Massachusetts Wharf Coal Co., and the Edison Electric Illuminating Co.

The New England Gas & Coke Co. property consists of a tract of about 300 acres fronting on Island End River at its confluence with the Mystic. The Metropolitan Coal Co. and the Boston Elevated Railway Co. occupy five wharves located in various sections of the harbor. The Philadelphia & Reading Coal & Iron Co. has extensive coal-handling facilities at the Mystic Wharves of the Boston & Maine Railroad, while the Massachusetts Wharf Coal Co. occupies Pier No. 6 of the Boston & Albany Railroad terminal in East Boston.

Perhaps as many as 15 other wharves are occupied by coal companies. Practically all of these are located on the shallower channels of the inner harbor, many being situated on the South Bay extension of Fort Point Channel, which appears to be given over largely to the coal and lumber trade.

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Comparatively few large industrial concerns occupy water-front property, the most important being the American Sugar Refining Co., which has a wharf on Fort Point Channel adjacent to its refinery.

The directors of the port state that 15 piers, 3 marine railways, and 3 dry docks, not including the docks at the United States Navy Yard in Charlestown, are devoted to the building, laying-up, and repair of vessels other than yachts. All of these are located in East Boston. Twenty-one piers, fifteen of which are located in South Boston, are used as landings for yachts or for public recreation purposes.

**Type of wharf construction.**—The prevailing form of construction is that of solid-filled piers with granite or stone retaining walls.

**Port administration.**—Prior to 1911 the port of Boston was under the control of the Board of Harbor and Land Commissioners, a State board which has control of all State lands and of the rivers, harbors, tides, waters, and foreshores within the Commonwealth. Since 1911 the port has been under the control of a board known as the Directors of the Port of Boston.

This board now consists of three members appointed by the governor with the advice and consent of the governor's council (State legislature). The governor designates one member as chairman and another as secretary. Each member is required to devote his entire time to the work of the board and each receives an annual salary of $6,000. The terms of office of the persons first appointed by the governor have been so arranged that the term of one member shall expire each year, the term thereafter to be three years for each member.

It is interesting to note that the organic act of 1911 provided for five members, including the chairman of the board of harbor and land commissioners as an ex officio member. Three members were to be appointed by the governor and one by the mayor of the city of Boston. This act was amended as indicated above, so as to provide for a board of three members independent of all municipal control and of the state harbor and land commission.

The directors may employ "such engineers, clerks, agents, assistants, and other employees as they may deem necessary to carry out the purposes of this act and shall determine the duties and compensation of such employees." The staff of the board is divided into three divisions: (1) Office force, including clerk of the board, statistician, and other office employees; (2) engineering division, consisting of chief engineer, assistant engineers, draftsmen, and field force; and (3) operating division consisting of a superintendent, a wharfinger, and various laborers on each pier.

The jurisdiction of the directors extends to all "that part of Boston harbor lying westerly and inside of a line drawn between Point Allerton on the south and the southerly end of Point Shirley on the north." [a] The district thus included has a surface area of about 47 square miles, exclusive of numerous islands, and embraces a considerable frontage that is comparatively inactive.

The Directors of the Port of Boston were given "all the rights, powers, and duties now pertaining to the board of harbor and land commissioners in respect to such lands, rights in land, flats, shores,

[a] An act relative to the development of the port of Boston, Acts of 1911, chap. 748, sec. 4.

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waters, and rights belonging to the Commonwealth in tide waters and land under water" [a] in Boston Harbor as described above.

The directors were also given express power to "take or acquire by purchase or otherwise, and hold, such real property and such rights and easements therein" as they may consider necessary for the development of the port.[a] The organic act also gave the directors power to "lay out and build such piers, with buildings and appurtenances, docks, highways, waterways, railroad connections, storage yards and public warehouses, as in the opinion of the directors may be desirable." [b]

The act requires, moreover, that "all piers and other similar structures built by the directors shall be equipped either by the directors or by lessees thereof with fireproof sheds, railway tracks, cranes, and other machinery and accommodations for the convenient, economical, and speedy loading and discharge of freight." [c]

The directors are given express authority also "to grade and surface suitably any railroad locations or traffic ways on property owned or acquired by them;" to change grades of railroads and public ways; and "to provide suitable and convenient track locations between the rails serving any pier or piers and those of any existing or proposed railroad that now reaches or hereafter may reach Boston." [d]

The directors may own and operate lighters, and all piers held or controlled by the directors must be kept open to lighterage traffic. The directors have power to lease the terminal facilities under their control provided the period of the lease does not exceed 20 years, except in the case of sites for warehouses and industrial plants, when the period may exceed that limit, with the express stipulation, however, that a readjustment of the rental must be made at intervals of not more than 20 years. No lease for a term of more than 5 years is valid unless it is approved by the governor and council (legislature).

The directors are given power to make "reasonable" rules and regulations governing the operation of the facilities under their control and to make reasonable charges for the use of the same.

All revenues and income of the directors are paid into a special fund, called the "port of Boston fund," in the hands of the treasurer and receiver general of the Commonwealth, but the port directors can not make any expenditure except for maintenance of the physical property under their control without legislative sanction.

Funds for the purchase and improvement of land, the construction of piers, warehouses, etc., and the purchase of equipment have been provided by bond issues voted by the State legislature. It is believed that maintenance and operating expenses also have been largely met out of the funds raised by bond issues, since the facilities of the port are not yet self-sustaining.

Yearly appropriations from the port of Boston fund are made to cover the salaries of the directors and their employees and the office and general expenses of the board.

No taxing power has been given the directors, and no tax levy has been made available for their use.

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[a] An act relative to the development of the port of Boston, Acts of 1911, chap. 748, sec. 5.
[b] Idem, sec. 4.
[c] Idem, sec. 8.
[d] Idem, sec. 10.

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**Port charges**—*Pilotage.*—The following is a list of the pilotage charges of the port of Boston:

| Draft of vessel. | Rates per foot draft. | | Draft of vessel. | Rates per foot draft. | |
|---|---|---|---|---|---|
| | Outward. | Inward. | | Outward. | Inward. |
| 7 feet | $1.65 | $2.64 | 22 feet | $3.75 | $4.50 |
| 8 feet | 1.66 | 2.69 | 23 feet | 4.00 | 5.00 |
| 9 feet | 1.67 | 2.73 | 24 feet | 4.25 | 5.00 |
| 10 feet | 1.70 | 2.77 | 25 feet | 5.00 | 5.00 |
| 11 feet | 1.74 | 2.80 | 26 feet | 5.00 | 5.00 |
| 12 feet | 1.78 | 2.85 | 27 feet | 5.00 | 5.00 |
| 13 feet | 2.00 | 2.95 | 28 feet | 5.00 | 5.00 |
| 14 feet | 2.00 | 3.45 | 29 feet | 5.00 | 5.00 |
| 15 feet | 2.10 | 3.50 | 30 feet | 5.00 | 5.00 |
| 16 feet | 2.25 | 3.55 | 31 feet | 5.00 | 5.00 |
| 17 feet | 2.50 | 3.75 | 32 feet | 5.00 | 5.00 |
| 18 feet | 2.75 | 3.80 | 33 feet | 5.00 | 5.00 |
| 19 feet | 3.00 | 4.00 | 34 feet | 5.00 | 5.00 |
| 20 feet | 3.25 | 4.25 | 35 feet | 5.00 | 5.00 |
| 21 feet | 3.50 | 4.25 | | | |

*Towage.*—The following table contains a list of rates for towing schooners from docks below bridges to various points in the outer harbor. Towage inward is performed at the same rates. The table also shows the charges made for docking and undocking, that is, putting schooner in berth and taking schooner out of berth.

| Tonnage of vessel. | Rates for towing from docks below bridges to— | | | Rates for docking or undocking. | | |
|---|---|---|---|---|---|---|
| | Below Castle. | Long Island Head or Quarantine. | Nantasket Roads, Boston Light, or Graves. | Below bridges. | Through one bridge. | Through two bridges. |
| 200–300 | $8.00 | ..... | ..... | $6.00 | $10.00 | $15.00 |
| 300–400 | 10.00 | ..... | ..... | 7.00 | 12.00 | 18.00 |
| 400–500 | 11.00 | ..... | ..... | 8.00 | 14.00 | 19.00 |
| 500–600 | 13.00 | $17.00 | ..... | 10.00 | 16.00 | 20.00 |
| 600–700 | 15.00 | 19.00 | ..... | 12.00 | 18.00 | 22.00 |
| 700–800 | 18.00 | 23.00 | $30.00 | 14.00 | 20.00 | 24.00 |
| 800–900 | 20.00 | 25.00 | 35.00 | 16.00 | 21.00 | 26.00 |
| 900–1,000 | 22.00 | 27.00 | 36.00 | 18.00 | 24.00 | 29.00 |
| 1,000–1,100 | 24.00 | 30.00 | 38.00 | 19.00 | 26.00 | 31.00 |
| 1,100–1,200 | 25.00 | 31.00 | 40.00 | 20.00 | 28.00 | 36.00 |
| 1,200–1,300 | 27.00 | 33.00 | 42.00 | 22.00 | 29.00 | 39.00 |
| 1,300–1,400 | 28.00 | 34.00 | 44.00 | 23.00 | 30.00 | 42.00 |
| 1,400–1,500 | 29.00 | 35.00 | 46.00 | 24.00 | 32.00 | 45.00 |
| 1,500–1,600 | 31.00 | 38.00 | 48.00 | 25.00 | 34.00 | 48.00 |
| 1,600–1,700 | 32.00 | 39.00 | 50.00 | 26.00 | 35.00 | 51.00 |
| 1,700–1,800 | 34.00 | 41.00 | 52.00 | 28.00 | 36.00 | 54.00 |
| 1,800–1,900 | 35.00 | 42.00 | 54.00 | 29.00 | 38.00 | 56.00 |
| 1,900–2,000 | 36.00 | 43.00 | 56.00 | 30.00 | 40.00 | 60.00 |
| 2,000–2,100 | 38.00 | 46.00 | 60.00 | 32.00 | 42.00 | 62.00 |
| 2,100–2,200 | 40.00 | 48.00 | 64.00 | 33.00 | 44.00 | 64.00 |
| 2,200–2,300 | 41.00 | 49.00 | 66.00 | 34.00 | 45.00 | 66.00 |
| 2,300–2,400 | 42.00 | 50.00 | 70.00 | 35.00 | 46.00 | 68.00 |
| 2,400–2,500 | 43.00 | 52.00 | 75.00 | 36.00 | 48.00 | 70.00 |
| 2,500–2,600 | 45.00 | 54.00 | 77.00 | 38.00 | 50.00 | 72.00 |
| 2,600–2,700 | 46.00 | 55.00 | 80.00 | 39.00 | 52.00 | 74.00 |
| 2,700–2,800 | 48.00 | 58.00 | 83.00 | 40.00 | 54.00 | 76.00 |
| 2,800–2,900 | 50.00 | 60.00 | 86.00 | 42.00 | 55.00 | 78.00 |
| 2,900–3,000 | 51.00 | 62.00 | 90.00 | 43.00 | 56.00 | 80.00 |
| 3,000–3,200 | 53.00 | 65.00 | 93.00 | 47.00 | 60.00 | 84.00 |
| 3,200–3,600 | 57.00 | 71.00 | 100.00 | 49.00 | 62.00 | 86.00 |
| Over 3,600 [a] | ..... | ..... | ..... | ..... | ..... | ..... |

[a] Price to be made.

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*Harbor dues.*—No harbor dues are assessed at the port of Boston.

*Dockage.*—No charge is made to the steamship companies using the railroad piers or the State pier. The regular lines of coastwise steamships have their own terminals or occupy terminals under long-term leases. Coastwise vessels engaged in the coal or lumber trade are generally supplied with berths by the companies controlling the cargo.

*Wharfage.*—Freight to or from Boston and the immediate vicinity is assessed a charge for wharfage at the average rate of 40 cents per ton. The wharfage on through freight, on which the railroad derives a revenue for hauling, is absorbed by the railroad company.

*Switching charges.*—The Union Freight Railroad switches carload lots of freight between any railroad and any of the coastwise piers on the Atlantic Avenue water front at the rate of 1 cent per 100 pounds, not including handling charges, and between the New York, New Haven & Hartford and the Boston & Maine railroads, at the rate of 2 cents per 100 pounds for domestic freight and 1 cent per 100 pounds for through import and export freight. The other railroads charge, on the average, 2.5 cents to 3 cents per 100 pounds on freight from noncompetitive points and 4.5 cents per 100 pounds on traffic from competitive points.

## BRIDGEPORT, CONN.

Bridgeport Harbor is about 57 miles northeast of the Battery, New York City, and about 16 miles southwest of New Haven Harbor. It consists of a shallow bay, about 1 mile wide at the mouth and 1½ miles long, into the extreme northwest corner of which empties the Pequonock River, a small tidal stream navigable for about 1 mile. Into the northeast corner flows another small stream about three-fourths of a mile long known as Johnsons River. Midway between these two streams is Yellow Mill Pond, a tidal basin about 1 mile in length. Cedar Creek and Burr Creek also form parts of the harbor.

The principal portion of the harbor consists of the Main Channel, which is an extension of the Poquonock River. This channel is now 300 feet wide and 22 feet deep at mean low water from Long Island Sound to a point just inside the inner breakwaters and 18 feet deep from that point to the Stratford Avenue Bridge. The Poquonock River Channel has a width of from 100 to 230 feet and a depth of 18 feet from the Stratford Avenue Bridge to a point nearly 1 mile beyond. Yellow Mill Channel, extending from the main channel to the head of Yellow Mill Pond, is about 1 mile long, 100 feet wide, and 12 feet deep. Johnsons River Channel extends about 1½ miles from the main channel and is 100 feet wide and 9 feet deep. Cedar Creek Channel is 2½ miles in length, 100 feet in width, and 12 feet in depth.

The mean range of tide is 6.5 feet.

**Railroads.**—Bridgeport is served by one railroad, the New York, New Haven & Hartford. It is on the main, or shore, line of this railroad as well as on a branch line extending to the northern part of the State.

**Steamship lines.**—Bridgeport is served by the following regular lines of steamships:

New England Steamship Co., which maintains between Bridgeport and New York a daily (except Sunday) service of two boats in each direction. One boat carries freight only; the other carries both freight and passengers.

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Merchants Steamboat Co., which operates one freight boat daily (except Sunday) between Bridgeport and New York. This line was originally a competitor of the New England Steamship Co., but is now under the same control, namely, that of the New York, New Haven & Hartford Railroad.

Port Jefferson Steamboat Co., which operates between Bridgeport and Port Jefferson on Long Island. The boat of this line carries both freight and passengers and makes one trip daily during the summer season and two trips weekly during the winter. This boat carries large quantities of farm products, shellfish, etc., and is used considerably for automobile traffic in the summer.

The close proximity of Bridgeport to New York enables the steamship lines to make quicker and prompter deliveries than the railroad can make. For example, the freight boat of the New England Steamship Co. leaves Bridgeport at 1 a. m., docks at New York at 5 a. m., is unloaded by 8 a. m., is loaded again and leaves by 11 a. m., and arrives in Bridgeport at 3.15 p. m. The freight and passenger boat of this line operates on about the same schedule, though at different hours.

In addition to the above-mentioned lines of steamships, there are three regular barge lines which carry coal from South Amboy to Bridgeport. These barges are brought in by tugs. These lines are the MacWilliams Blue Line, the MacWilliams Red Ball Line, and the McCafferty Line.

**Commerce of the port.**—According to commercial statistics compiled by the United States Army Engineers, the total volume of water-borne commerce handled at Bridgeport in the calendar year 1914 was 1,039,398 short tons, the estimated value of which was $67,003,508. In the year 1913, which was a more nearly normal trade year, and is, therefore, preferable for purposes of discussion, the total water-borne commerce was 1,083,047 short tons, valued at $43,727,074.[a] Practically all this traffic was inbound, the shipments amounting to only 99,145 short tons. Moreover, practically all of the commerce consisted of domestic trade, the foreign trade, which was made up entirely of imports, being valued at only $1,164,391.

Another feature of the commerce of Bridgeport is its local character. Formerly there was a large transshipment traffic. Raw materials, such as coal, iron, brass, and molding sand for the numerous factories in the valleys of the Naugatuck and Housatonic Rivers, were transferred from boats and barges to cars at Bridgeport. Now much of this traffic is handled either by all-rail route or is transshipped from vessel to car at New Haven.

Of the total traffic at this port in the year 1913, coal constituted about three-fifths, 640,074 short tons having been brought in during the year. The next item of importance was iron and steel products, 110,906 tons having been handled over the wharves of Bridgeport. In point of value, the most important item was miscellaneous steamboat freight.

**Extent and ownership of water front.**—While the extent of water front in the entire harbor of Bridgeport is considerable, the most valuable section is the frontage on the Main Channel and Pequonnock River where the depth of water is 18 feet. This valuable frontage, most of which parallels the main business district of the city, is owned by the New York, New Haven & Hartford Railroad system, the city of Bridgeport, and various coal companies.

[a] Report, Chief of Engineers, U. S. Army, 1914, p. 1670; idem, 1915, p. 2097.

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On Yellow Mill Channel much of the frontage is used for residential purposes. The only commercial use of this channel is made by the American Tube & Stamping Co., which uses its frontage in connection with a steel plant at this point. The city of Bridgeport owns some tidewater land abutting on this channel.

On the Johnsons River Channel the only improved wharf is that of the Lake Submarine Co. Cedar Creek Channel is used extensively by the Crane Valve Co., the Bridgeport Hydraulic Co., the Marine Tube & Stamping Co., and several coal companies.

**Terminals.**—The city of Bridgeport maintains two terminals. One consists of a wharf 47 feet wide at the foot of Wall Street near the head of the Main Channel and close to the main business district. This wharf is used chiefly as a landing place for excursion steamers, tugs, and oyster boats. The other wharf owned by the city is on the upper part of the Poquonock River and has a frontage of 112 feet with a slip alongside 185 feet in length. This wharf is used almost exclusively for supplies for the city. At this point the Poquonock River has a depth of 18 feet and this wharf could be made a more useful terminal.

The terminals owned by the city are plainly inadequate but there is no immediate prospect that the city will acquire more frontage or that it will improve its present holdings. In a preliminary report recently published, the city plan commission suggests that the city should acquire a large tract of low-lying land in the adjoining town of Stratford, close to the water front, for development as industrial sites.

The most extensive owner of water frontage at Bridgeport is the New York, New Haven & Hartford Railroad Co. and its subsidiaries. Of their entire frontage only a part has been improved and is used for water-borne commerce, the major part of this frontage being used as a right of way for the railroad, which passes through Bridgeport on an elevated structure. The principal terminal owned by the railroad consists of a wharf used by the New England Steamship Co. This wharf is improved by a frame shed 700 feet in length and 30 feet in width and is equipped with two inclined moving platforms, on which trucks, boxes, and packages can be conveyed from the hold of the ship to the floor of the shed. Another wharf owned by this company is equipped with a coal hoist and is used only for soft coal brought in for the company's use. Another terminal extends from the city wharf at the foot of Wall Street to the Stratford Avenue Bridge. This wharf is improved by a frame warehouse and is used by the boats of the Port Jefferson Steamboat Co., which is believed to be controlled by the New Haven Railroad. It is also used at times by the passenger boats of the New England Steamship Co.

Reference has already been made to the water-front properties of the Crane Valve Co. on Cedar Creek and of the American Tube & Stamping Co. on Yellow Mill Channel and Cedar Creek. A large amount of coal as well as of finished products is handled over these wharves. Billets made at the open-hearth steel plant of the American Tube & Stamping Co. on Yellow Mill Channel are carried by boat to the tube mill of this company on Cedar Creek.

Large quantities of coal are handled over the wharves of private dealers. These wharves are equipped with efficient coal-handling

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machinery. In addition, considerable quantities of coal are handled over the wharves of the Bridgeport Hydraulic Co. on Cedar Creek and of the Bridgeport Traction Co. near the Main Channel.

**Type of wharf construction.**—The prevailing type of wharf at Bridgeport consists of a stone or timber bulkhead filled with earth flanked by a narrow pile apron. The wharves are with few exceptions parallel to the channels.

**Port administration.**—The administration of the port is under the supervision of the director of public works, who is appointed by the mayor for two years, and of a harbor master, who is chosen by the city common council for a term of three years.

The harbor master performs the usual duties of that office and in addition looks after the municipal wharf at Wall Street. He has, however, no control over the city-yard wharf on the upper Poquonock River, which is directly under the control of the director of public works. The rates of wharfage at the Wall Street dock, it is interesting to note, are fixed by the harbor master.

**Port charges**—*Pilotage.*—Pilots are not generally taken except by vessels subject to compulsory pilotage, those vessels being foreign and United States registered vessels drawing 9 feet and over, if spoken. The following are the rates of pilotage: $1.50 per foot draft inward and $1 per foot outward; for square-rigged vessels, $2 per foot inward and the same outward. From November 1 to April 1 an additional charge of 25 cents per foot is made.

*Harbor dues.*—No harbor dues are assessed at this port.

*Dockage.*—The only public terminals are those owned by the city and two owned by the Crane Valve Co. at the head of Cedar Creek. The municipal wharf at Wall Street can accommodate only very small boats. A charge of $10 is made for the use of this wharf by excursion boats. Oyster boats and tugs may tie up at this wharf without charge. The same is practically true of the city-yards wharf on the upper river. For the use of its wharves on Cedar Creek the Crane Valve Co. charges $1 per day. There are other wharves which are reported by their owners as open to all carriers, but they are not used extensively except by their owners.

*Wharfage.*—At the municipal wharves and those of the Crane Valve Co. a wharfage charge of 5 cents per gross ton of cargo is made.

*Switching.*—A charge is made for switching cars from the main line of the railroad to any of the piers and vice versa on all goods of local origin and destination.

## FALL RIVER, MASS.

The city of Fall River is located in the northeastern angle of Mount Hope Bay, on a granite ridge at the mouth of Taunton River, which empties into the ocean through Narragansett Bay and Sakonnet River.

The harbor is about 2 miles long, with a width of one-fourth of a mile to 1 mile. It is about 23 miles southeast of Providence and about 18 miles north of Newport. The minimum usable depth in the improved area is about 22 feet. The mean range of tide is 4.75 feet.[a]

[a] Report, Chief of Engineers, U. S. Army, 1914, p. 112.

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**Railroads.**—The city of Fall River is served by one railroad, the New York, New Haven & Hartford.

**Steamship lines.**—The only regular lines of steamships serving Fall River are the Fall River Line of the New England Navigation Co., which is the principal marine branch of the New York, New Haven & Hartford Railroad Co., and the Dyer Transportation Co.

The Fall River Line operates one freight and passenger boat daily and one freight boat almost daily, in each direction, between Fall River and New York City. The greater part of the tonnage handled by the boats of this line consists of through shipments, the freight being transferred at Fall River from boats to rail and vice versa. The Dyer Transportation Co. owns two small freight boats and maintains a daily-except-Sunday service of one boat in each direction between Fall River and Providence.

Formerly three other steamboat lines ran between Fall River and New York, namely, the Enterprise Line, the Neptune Line, and the Joy Line. In addition, the Merchants & Miners Transportation Co. formerly maintained a regular schedule of sailings between Fall River and Philadelphia, but this has been abandoned in recent years. One of the strongest arguments now being made by the city of Fall River in its appeal to the State legislature for assistance in building a public terminal at Fall River is the fact that the city has lost all of its steamship services except those of the Fall River and the Dyer Lines.

**Commerce of the port.**—In the calendar year 1914, according to commercial statistics compiled by the United States Army Engineers, the water-borne commerce at the port of Fall River amounted to 1,427,799 short tons, the value of which was $49,870,290. In the year 1913, which was a more nearly normal trade year and, therefore, is preferable for purposes of discussion, it amounted to 1,286,077 short tons, valued at $50,714,675.[a] From the standpoint of tonnage, coal was the most important item, 588,220 short tons of bituminous coal and 196,171 tons of anthracite being received at Fall River during the year. From the standpoint of value, general merchandise, or steamboat freight, was the most important item. This group of commodities accounted for more than 80 per cent of the total value of the commerce of the port and for more than 30 per cent of the total tonnage.

Practically all of this general merchandise was carried in the vessels of the Fall River Line and consisted very largely of through traffic that was transshipped at Fall River for delivery in New York or in cities in Massachusetts. Although Fall River is a very important cotton-manufacturing city, it receives on the average only about 25 per cent of its cotton by water. None of the cotton brought by boat comes direct from southern ports, but all of it is transhipped at New York City.

**Extent and ownership of water front.**—The city of Fall River is located on the eastern shore of Mount Hope Bay and Taunton River. The total water frontage from the northernmost wharf at the Sagamore Mill to the Rhode Island State line at the southern limit of the city is about 25,000 feet, of which only 8,000 feet have been developed. A considerable portion of this frontage, however, is not available for

[a] Report, Chief of Engineers, U. S. Army, 1914, p. 1628; idem, 1915, p. 2065.

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terminal development because of steep grades between the river and the city. A considerable part, about 2,600 feet, is owned by manufacturing establishments and by a number of coal companies, which occupy approximately 3,300 feet of frontage. Several of the most important cotton mills and print works in Fall River are to be found on the water front. About 1,000 feet of frontage is owned by the Fall River Gas Works, the Fall River Electric Light Co., and the Bay State Street Railway Co.

The New York, New Haven & Hartford Railroad Co., whose tracks are close to the water's edge throughout the greater portion of this distance, owns two tracts fronting on the harbor. One tract, a narrow strip about 2,200 feet in length, is situated in the lower part of the harbor and is used exclusively as a freight yard. The other tract, at the foot of Central Street, has 1,100 feet of frontage and has been improved by the construction of three piers, which are used by the boats of the Fall River Line.

The city of Fall River owns three parcels of land with water frontage. One of these is about 1,000 feet in length and belongs to a city park. It is not available for terminal development, since it would be very difficult to secure street connections for a wharf at this point without creating a grade crossing over the railroad. The other tracts owned by the city, one at the foot of Odd Street in the upper part of the harbor and one at the foot of Ferry Street in the lower part of the harbor, are improved by small wharves. The Odd Street wharf is used for city supplies and also as a public wharf, but is in poor condition. The Ferry Street wharf has only a shallow depth alongside and is no longer in use.

**Terminals.**—The only wharves that have rail connections are those of the New York, New Haven & Hartford Railroad Co., which are used exclusively by the Fall River Line, and one of the wharves owned by the Staples Coal Co., which is used exclusively by them for the transshipment of coal by rail. A pier that was formerly used by the Merchants & Miners Transportation Co., but is now idle, also has direct rail connection. Another wharf, which is said to belong to the estate of G. Henry Whitcomb, and which was formerly used by the steamers of the Enterprise Line, is connected by rail with the Old Colony Street Railway. When this wharf was used by the Enterprise Line trolley cars were run from Boston to the wharf, but this service was discontinued several years ago.

Reference has already been made to the inadequacy and poor condition of the terminals owned by the city of Fall River, but it should be said that the commercial interests of this city have been endeavoring for several years past to secure adequate and modern terminals. The Legislature of the State of Massachusetts, in an act approved July 2, 1914, created the "Board for the Development of the Port of Fall River," and empowered the board to select a site for a public pier at Fall River and to make plans and estimate the cost of procuring the land and of erecting a pier. In February, 1915, this board made a report to the legislature recommending several sites and, in accordance with the recommendations of the board, a bill has been prepared which provides an appropriation by the State of $400,000 for the building of the pier, the site for which is to be provided by the city of Fall River. This bill has been favorably reported

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out of the committee on harbors and public lands and it is expected that it will get the same treatment from the committee on ways and means.

The terminals used by the Fall River Line and the New York, New Haven & Hartford Railroad consists of three piers provided with frame sheds.

The terminal used by the Dyer Transportation Co. is in close proximity to the Fall River Line terminals. This terminal, which is leased from the Merchants & Miners Transportation Co., has no rail connection and has only a small warehouse.

A considerable number of coal piers have modern towers for elevating coal. Several of these coal towers are the property of cotton-manufacturing establishments. The equipment of the electric-light company is modern and very efficient.

**Type of wharf construction.**—The United States Army Engineers report that "the prevailing type of wharf construction is a stone-walled structure, built on pile foundations projecting from the shore or built along the shore line, the walls being filled in with loose rock or earth. The walls generally are of granite block and a few of them have a pile extension along the face."

**Port administration.**—No branch of the municipal government is especially charged with the supervision of port affairs. There is, however, a harbor master, who is appointed by the city and performs the usual duties of that office. If the Massachusetts Legislature passes the act providing for the improvement of the harbor at Fall River, this work will be carried on under the control and direction of the State Board of Harbor and Land Commissioners, which has control of all ports in the State except the port of Boston.

**Port charges.**—*Pilotage.*—The rates of pilotage at Fall River are the same as those for ports in Rhode Island, probably because the channel entrance for both Fall River, Mass., and Providence, R. I., is in Narragansett Bay.

The rates as fixed by the pilot commissioners of the State of Rhode Island are as follows:

| Draft of vessel. | Pilotage per foot of draft. | Draft of vessel. | Pilotage per foot of draft. |
|---|---|---|---|
| 7½ feet and under | $1.25 | 14 to 14½ feet | $2.50 |
| 8 to 9½ feet | 1.50 | 15 to 15½ feet | 2.75 |
| 10 to 11½ feet | 1.75 | 16 to 16½ feet | 3.00 |
| 12 to 12½ feet | 2.00 | 17 to 17½ feet | 3.25 |
| 13 to 13½ feet | 2.25 | 18 feet | 3.50 |

The outward rates of pilotage are the same as the inward rates.

*Towage.*—This subject is one of comparatively little significance at a port such as Fall River.

*Harbor dues.*—No harbor dues are assessed at this port.

*Dockage and wharfage.*—The matter of dockage and wharfage charges is at present one of little importance at the port of Fall River. Practically all the vessels calling at this port belong to the regular lines of steamships that have their own wharves or are coal-carrying vessels which are accommodated free of charge at the wharves of the several coal companies and manufacturing plants.

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## HARTFORD, CONN.

The city of Hartford is located on the Connecticut River about 52 miles by channel from its mouth in Long Island Sound and about 30 miles south of Holyoke, Mass., which is at the head of navigation on the river.

The river is now being improved under a project that calls for a channel 100 feet wide and 12 feet deep at mean low water from the city of Hartford to the bar at the mouth of the river and for a channel 300 feet wide and 15 feet deep at mean low water across the bar.[a] The mean range of tide is 1 foot. The United States Coast and Geodetic Survey reports that—

> Each year after the spring freshets shoals, with a least depth of about 10 feet, are found in places on the bars in the upper river; dredging for the removal of such shoals is begun as soon as the water subsides. * * * The deepest draft usually taken up the river to Middletown and Hartford is 10 to 11 feet, but during freshets vessels drawing 14 feet have sometimes gone up to Hartford.[b]

Above Hartford the Connecticut River is navigable for a distance of about 30 miles to Holyoke, Mass., for boats of not more than 3 feet draft when the river is not too low,[c] but it is used by only a few boats of no commercial importance.

**Railroads.**—Hartford is served by the New York, New Haven & Hartford Railroad.

**Steamship lines.**—Only one line of steamships, the Hartford & New York Transportation Co., calls regularly at Hartford. This line operates one freight and passenger boat daily except Sunday in each direction between Hartford and New York and intermediate points on the Connecticut River.

**Commerce of the port.**—Statistics compiled by the United States Army engineer in charge of the district show that the commerce carried on the Connecticut River in the calendar year 1914 amounted to 559,728 short tons, the value of which was $35,193,843. In the year 1913, which was a more nearly normal trade year and, therefore, is preferable for purposes of discussion, it amounted to 644,633 short tons, valued at $38,843,682.[d] Shipments amounted to only 93,321 tons and receipts to 551,312 tons. Unfortunately, no data are at hand to show the tonnage and value of the commerce handled at Hartford alone. It is quite possible that the value may fall below the minimum of $30,000,000, selected as the test for the inclusion of a port in this discussion. Since, however, the value may reach or exceed this amount, the city has been included.

Coal constituted nearly seven-tenths of the total tonnage on the river in 1913, the quantity carried being 445,051 short tons. The commodities reported, in their order of importance in 1913, are as follows:

| Commodities. | Short tons. | Commodities. | Short tons. |
|---|---|---|---|
| Coal | 445,051 | Lumber, etc | 6,692 |
| Steamboat freight | 101,656 | Building materials | 2,871 |
| Sandstone and feldspar | 64,178 | All other | 2,445 |
| Fertilizer | 12,401 | | |
| Petroleum products | 9,339 | Total | 644,633 |

[a] Report, Chief of Engineers, U. S. Army, 1914, p. 147.
[b] Coast Pilot, Atlantic Coast, Part IV, p. 83.
[c] Idem, p. 84.
[d] Report, Chief of Engineers, U. S. Army, 1914, p. 1658; idem, 1915, p. 2087

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No values are reported except for the total commerce, but it is safe to assume that the value of steamboat freight constituted more than nine-tenths of the total value.

**Extent and ownership of water front.**—The Connecticut Rivers, Harbors, and Bridges Commission reported in 1910 [a] that the river front at Hartford was approximately 32,590 feet, or 6.17 miles, in length, of which 10,780 feet were improved and 21,810 feet unimproved. The following tabular statement shows the character of ownership of the developed and undeveloped sections of the water front:

| Owners. | Improved. | Unimproved. | Total. |
|---|---|---|---|
| | *Feet.* | *Feet.* | *Feet.* |
| City of Hartford | 5,770 | 2,100 | 7,870 |
| State of Connecticut | 1,730 | ..... | 1,730 |
| New York, New Haven & Hartford R. R. | | | |
| Hartford & New York Transportation Co | 2,520 | ..... | 2,520 |
| Connecticut Co | | | |
| Hartford Gas Light Co | | | |
| Hartford Electric Light Co | 390 | ..... | 390 |
| Colt Patent Fire Arms Co | 300 | ..... | 300 |
| A. J. & T. B. Farwell | 70 | ..... | 70 |
| All other | ..... | 19,710 | 19,710 |
| Total | 10,780 | 21,810 | 32,590 |

Of the improved frontage owned by the city of Hartford, 4,950 feet are devoted to parks, while 820 feet are used by the water department. In addition, the city occupies under lease the frontage of 300 feet that is owned by the Colt Patent Fire Arms Co. The frontage owned by the State is held for the Connecticut River Bridge and Highway District.

**Terminals.**—The city maintains a public wharf at the foot of Charter Oak Avenue on the tract of land leased from the Colt Patent Fire Arms Co. This tract covers an area of about 4.3 acres and has a water frontage of 300 feet. The wharf is of stone and concrete construction and is built with two levels, so as to make it available for use at both high and normal stages of the river. At low water it has a frontage of about 150 feet and at high water 100 feet. In connection with the wharf is a brick warehouse containing about 7,500 square feet of floor space. The wharf is equipped with a derrick and a portable steam hoisting engine.

The Connecticut Rivers, Harbors, and Bridges Commission reports [b] that "since the establishment of this dock there has been an increase in business each year. During the open season of 1912 there have been arrivals from Jacksonville, Fla., Portsmouth, Va., Halifax, Nova Scotia, St. Johns, New Brunswick, and from other near-by ports. The cargoes unloaded have consisted principally of lumber, fireproofing, and plaster."

General Wharf, which is located at the foot of State Street, is maintained as a free public wharf by the Connecticut River, Bridge, and Highway Commission. It has a frontage of about 350 feet.

**Type of wharf construction.**—It is reported that nearly all of the the principal wharves on the Connecticut River are "substantial stone bulkheads solidly filled with earth and provided with fender

[a] Special Report of the Commission, issued in 1911, p. 12.
[b] Report for two years ended Dec. 31, 1912, Public Document No. 57 (State of Connecticut), p. 42.

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piles along their faces. Open pile structures are not used on account of damage from ice and freshet."[a]

**Port administration.**—All of the harbors within the State are under the general control of a State board known as the Connecticut Rivers, Harbors and Bridges Commission. This board consists of five members, who are appointed by the governor for terms of six years and who serve without pay.

The city of Hartford was granted by legislative act in 1909 the right to build, own, or lease public water terminals, together with the right of condemnation for such purposes for a period of 10 years.

**Port charges.**—*Pilotage.*—The United States Coast and Geodetic Survey reports that "a pilot, at reasonable rates, can be had at Saybrook Point, and strangers bound up the river should take one."[b]

*Towage.*—No data on this subject are available.

*Harbor dues.*—No harbor dues are assessed.

*Dockage and wharfage.*—At the Municipal Wharf and the Hartford Gas Light Co.'s wharf a flat charge of 1½ cents per ton of cargo is made against the vessel for dockage and a charge of 10 cents per ton of cargo against the cargo itself for wharfage, except in the case of lumber, in which case the dockage and wharfage charges are, respectively, 3 cents and 15 cents per 1,000 feet b. m. No charge is made for use of the State wharf.

## NEW BEDFORD, MASS.

The port of New Bedford is located on an estuary of Buzzards Bay at the mouth of the Acushnet River. It may be said to include the town of Fairhaven on the opposite shore of the river as well as the city of New Bedford. The harbor is about 21 miles by water from Long Island Sound.

The entire harbor extends in a northerly and southerly direction for about 5 miles. In the upper 2 miles the harbor is about three-fourths of a mile wide and in the lower 3 miles about 1⅞ miles wide. The northerly end narrows into the Acushnet River, which extends about 1½ miles farther north, where it becomes very shallow, while the lower, or southerly, end opens into Buzzards Bay and has very little depth.

The wharves are reached by a channel 300 feet wide and 25 feet in depth at mean low water, which extends from Buzzards Bay to the north end of Fish Island just above the drawbridge connecting New Bedford with Fairhaven. It is proposed also to dredge a channel up the Acushnet River to a depth of 18 feet at mean low water and a width of 100 feet for a distance of about 2 miles above this bridge.[c] The mean range of tide at the entrance and within the harbor is about 4½ feet.

New Bedford, which formerly was famous as the world's greatest whaling port, is now chiefly known as a cotton-manufacturing city. The city has grown rapidly in recent years. It ranks second among the ports of Massachusetts in the volume of commerce and third in the value. The port of New Bedford is located in close proximity

[a] Special Report of Chief of Engineers, U. S. Army, on Water Terminal and Transfer Facilities, 1913 (H. Doc. No. 226, 63d Cong., 1st sess.), p. 124.
[b] Coast Pilot, Atlantic Coast, Part IV, p. 85.
[c] Report, Chief of Engineers, U. S. Army, 1914, pp. 108–110.

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to one entrance of the Cape Cod Canal, the boats using the canal passing within 8 miles of the New Bedford water front.

**Railroads.**—The city of New Bedford is served by the New York, New Haven & Hartford Railroad. The tracks of the railroad follow closely the shore line on the New Bedford side of the harbor and physical connection has been made with the wharves of the New Bedford, Marthas Vineyard & Nantucket Steamboat Co., the Philadelphia & Reading Coal Co., the Garfield & Proctor Coal Co., and the Wamsutta Cotton Mills Co.

**Steamship lines.**—Only one important steamship line operates from this port, the New Bedford Line of the New England Steamship Co., which maintains a daily freight service between New Bedford and New York. Another line, the New Bedford, Marthas Vineyard & Nantucket Steamboat Co., maintains a daily freight and passenger service between New Bedford and the points named, which are not far distant. In addition, a ferryboat is operated by the New Haven Railroad, to connect its line on the New Bedford side with the lines running to Cape Cod on the Fairhaven side.

**Commerce of the port.**—According to the commercial statistics published by the United States Army Engineers,[a] the water-borne commerce at New Bedford in the calendar year 1914 was 1,460,784 short tons, valued at $43,354,029. In the year 1913, which was a more nearly normal trade year and is, therefore, preferable for purposes of discussion, it amounted to 1,491,047 short tons, valued at $46,360,645. Coal accounts for three-fourths of the total tonnage, 832,063 short tons of bituminous coal and 286,419 tons of anthracite having been handled over the wharves of New Bedford during the year. From the standpoint of value, general merchandise, or steamboat freight, was the most important. The value of this group of commodities in 1913 was $20,761,883 and the quantity 264,010 short tons. Next in importance was cotton, the value of which was $17,663,784. Lumber and building materials form a large item of trade at this port.

**Extent and ownership of water front.**—On the New Bedford side of the harbor, including Fish Island and Popes Island, there are about 36,800 feet of water frontage, but of this total only 8,016 feet have been developed in any degree. On the Fairhaven side approximately 5,000 feet of frontage are available. The most important frontage on the New Bedford side is on Fish and Popes Islands and on the shore to the south of the bridge, 20,104 feet in all. Less than one-half of this frontage, however, is adjacent to deep water. Above the bridge on the New Bedford side there is a frontage of 14,414 feet, of which only 953 feet have been developed.

The city of New Bedford owns 3,271 feet, of which 2,673 feet are below and 598 feet above Fairhaven Bridge. In this total are included 25 street ends with an aggregate frontage of 1,176 feet, also the Poor Farm property with a frontage of 1,240 feet, an unimproved stretch of 123 feet, a tract of 120 feet frontage covered with fish houses, and 612 feet improved by piers and wharves.

The Old Colony Railroad Co., which is controlled by the New York, New Haven & Hartford Railroad Co., owns 3,455 feet. One tract, with a frontage of 2,655 feet, is located above the Fairhaven Bridge,

[a] Report, Chief of Engineers, U. S. Army, 1914, p. 1627; idem, 1915, p. 2062.



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while two tracts, one of 640 feet frontage and the other of 160 feet frontage, are below the bridge. The larger tract below the bridge is used for the terminals of the New Bedford Line of the New England Steamship Co., and the other is used by the New Bedford Marthas Vineyard & Nantucket Steamboat Co. The tract above the bridge is used for railroad yards.

Many of the manufacturing establishments in New Bedford are located on the water front. The manufacturing companies own 14,393 feet of frontage—6,005 feet below and 8,388 feet above the bridge. A few of these plants have wharves for receiving coal and cotton but most of their frontage is unimproved. Coal companies own 2,495 feet of frontage, 632 feet below and 655 feet above the bridge and 1,208 feet on Fish Island. The electric light, gas, and power plants own 767 feet, all of which frontage is below the bridge. One lumber yard has 595 feet of frontage while several oil companies own 1,536 feet.

**Terminals.**—In 1897 the city of New Bedford bought two piers and later two additional piers, at a total cost of over $100,000. These terminals, which were located near the main business district, occupied a lineal frontage of 612 feet and had a total area of 134,760 square feet with a total docking length of about 2,400 feet, the longest berth being 300 feet. The depth of water alongside varied from 12 to 18 feet.

Pier No. 1 was the largest pier and had a length of about 300 feet. At the end of this pier the city built a frame shed, two stories in height, 60 feet wide and 100 feet long, for the accommodation of immigrants.

Piers Nos. 1 and 2 with the land adjacent thereto have been deeded to the State of Massachusetts, which has appropriated $350,000 for the building of a State pier at this point. The new pier will be 675 feet long on one side, 600 feet long on the other, and 119 feet in width. It will consist of a solid fill behind granite retaining walls, which will be protected by a row of fender piles. The slips on either side of this pier will be about 100 feet in width and will be dredged to a depth of 25 feet, although the foundations of the pier will permit dredging to 35 feet. There will be concrete and timber bulkheads at the head of these slips, one being 96 feet long and 16 feet wide and the other 36½ feet long and 16 feet wide. A steel and concrete shed, 300 feet long, 105 feet wide, and two stories high, will be erected on the end of the pier. The middle section of the shed will have a depressed floor and will be 45 feet in width, the central portion, 20 feet in width, being for the use of teams and the remainder for tracks, two on either side. The frame immigration shed, which was located on the end of the old City Pier No. 1, will be placed at the head of one of the slips.

The principal private terminal belongs to the New York, New Haven & Hartford Railroad and is used by the boats of the New England Steamship Co. This terminal adjoins, on the south, the new State pier and is well located. It has a frontage of 640 feet and covers an area of 209,870 square feet.

Practically all of the other terminals on the New Bedford side of the harbor are used as coal wharves, either by wholesale and retail coal dealers or by power plants, gas plants, and cotton-manufacturing establishments. It is interesting to note that although many cotton

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mills are located on the water front, only two such mills maintain wharves.

On the Fairhaven side of the harbor there are five wharves, only one of which appears to be in active use for commercial purposes. This one belongs to the New York, New Haven & Hartford Railroad Co. and is the terminal of its ferry to New Bedford and of its lines running from Fairhaven to points on Cape Cod. Two wharves are used merely for the storage and mooring of yachts or for whale ships, while two others, the town wharf and the tack factory wharf, are no longer in use.

**Type of wharf construction.**—The prevailing type of wharf construction is that of piers and slips. The piers are, as a rule, solid-filled structures with pile and timber bulkheads; but a few, including the new State pier, have granite walls around the pier and concrete bulkheads at the head of the adjacent slips.

**Port administration.**—In accordance with the custom in the smaller port cities, no special branch of the government is in charge of port affairs at New Bedford. The wharves are under the control of the department of public works and in the immediate charge of a city wharfinger. At the present time, the city wharfinger acts also as harbor master, a harbor master being required by State law. As harbor master he receives a salary of $300 a year and for his services as wharfinger he is compensated in fees. The new State pier, when completed, will be under the control of the State Board of Harbor and Land Commissioners, but the manner in which the pier will be operated has not yet been determined. It is probable, however, that, as a matter of economy, the city will be made the administrative agent of the State.

**Port charges.**—*Pilotage.*—The rates of pilotage for vessels bound into the ports of New Bedford and Fairhaven are $1.90 per foot draft from the sea to Clark Point Lighthouse and 35 cents per foot draft from the lighthouse to the inner harbor. An additional charge of 20 cents per foot is made for pilotage from November 1 to April 30. The outward rate of pilotage from the inner harbor to the lighthouse is 35 cents per foot draft and from the lighthouse to the sea $1.50 per foot.

*Towage.*—This subject is one of comparatively little importance at a port such as New Bedford.

*Harbor dues.*—No harbor dues are assessed at this port.

*Dockage.*—No rates for dockage can be quoted, since practically all vessels using this harbor dock at their own wharves or at wharves to which their cargoes are consigned. Casual steamers or sailing vessels have been accommodated at the city piers and only a small dockage charge has been made.

*Wharfage.*—The statement made above as to dockage applies with equal force to wharfage, except that a charge has been assessed on cargoes handled over the municipal terminals.

*Switching.*—A charge is made for switching cars from dock to railroad in the few cases where rail-and-water terminal connection exists.

## NEW HAVEN, CONN.

The city of New Haven is about 71 miles east of the Battery, New York City, and about 45 miles west of New London. It is situated on a bay 4 miles in length and from 1 to 4 miles in width.

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The harbor consists of the western shore of the bay and the West, Mill, and Quinnipiac Rivers. Mill River is navigable for about 2 miles above its mouth, the Quinnipiac for about 8 miles, and the West for about 2 miles.

The main channel in the harbor has a length of 4.2 miles, while the improved channels in the Mill, Quinnipiac, and West Rivers are 1 mile, 1.3 miles, and 1.9 miles in length, respectively. The main channel has a nominal depth at mean low water of 20 feet, while the Quinnipiac, West, and Mill Channels have depths of from 10 to 12 feet. The mean range of tide is 6 feet.

**Railroads.**—New Haven is served by one railroad, the New York, New Haven & Hartford, and is located on the main, or shore, line of that railroad, as well as on numerous branch lines. The city is, in fact, one of the most important centers on the entire New York, New Haven & Hartford Railroad system.

**Steamship lines.**—The principal steamship line at New Haven is the New York & New Haven Line of the New England Steamship Co., which maintains a daily service of one freight and passenger boat in each direction between New York and New Haven. Another line operating between New Haven and New York is the New Haven Steamboat Co., which is popularly known as the Starin Line and maintains a schedule of one boat daily in each direction. A third line, which carries both freight and passengers, operates between New Haven and Port Jefferson, on Long Island, and makes daily trips throughout the summer season and more or less irregular trips during the remainder of the year.

**Commerce of the port.**—In the calendar year 1914, according to commercial statistics prepared by the United States Army Engineers, the water-borne commerce at the port of New Haven amounted to 1,704,854 short tons, valued at $105,459,519. In the year 1913, which was a more nearly normal trade year, and is, therefore, preferable for purposes of discussion, it amounted to 2,096,135 short tons, valued at $123,093,133.[a] The great bulk of the commerce of the port consists of receipts, the shipments amounting to only 223,451 short tons in 1913. Moreover, the trade is almost entirely domestic. In 1913 the value of the foreign trade, which consisted entirely of imports, was only $477,825.

Coal constitutes about two-thirds of the total tonnage handled over the wharves of New Haven. In 1913, 1,319,185 short tons were received at the port. Practically all of this coal is brought from South Amboy and Philadelphia in towed barges. Next in tonnage is steamboat freight, which, in value, is by far the most important item. Oysters, lumber, oil, ingot copper, fertilizer, and building materials are among the other more important articles making up the commerce of the port.

**Extent and ownership of water front.**—The total length of water front at present in use or available for use in New Haven Harbor is about 7 miles.

Of the total frontage now available at New Haven, 17,020 feet are on the main harbor, 7,050 feet on West River, 7,690 feet on Quinnipiac River, and 4,440 feet on Mill River. The most important frontage, of course, is that on the main channel, which has a depth at mean low water of 20 feet, although the slips along the

[a] Report, Chief of Engineers, U. S. Army, 1914, p. 1664; idem, 1915, p. 2092.

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wharves on this channel are as a rule dredged to a depth of only 12 to 17 or 18 feet.

Of the total frontage, about 40 per cent, chiefly in the main harbor, is owned or controlled by the New York, New Haven & Hartford Railroad. The city of New Haven owns only 580 feet of improved frontage. Practically all of the remainder is owned by private individuals and corporations.

**Terminals.**—The principal wharves are to be found on the west side of the harbor near the head of the main channel in the section near one of the most important business and manufacturing districts in the city.

The city of New Haven owns one terminal, a pier 80 feet wide and about 370 feet long, which was constructed in 1901 at a cost of nearly $20,000. This pier has an available depth along one side of 15 feet at mean low water and is equipped with a steam derrick that is available for hire at $10 per day. It is open to all water carriers at fixed rates and is used to a large extent.

During recent years there has been considerable agitation by the chamber of commerce for additional municipal terminals. Engineers were engaged to investigate the matter, and a report containing a comprehensive study of the terminal situation has been made but no definite action has yet been taken on the project. The plan calls for the relocation of the present passenger and freight terminals of the New York, New Haven & Hartford Railroad, which is not in a position at the present time to undertake its share of the improvement. This project, moreover, calls for a wharf 1,200 feet long and 400 feet wide, with a fireproof warehouse.

The principal terminals at New Haven are those of the New York, New Haven & Hartford Railroad Co., which has six piers, known as Belle Dock, Middle Dock, Pocket Dock, Heatons Wharf, Canal Wharf, and Steamboat Dock. These piers afford an aggregate dockage length of more than 12,000 feet, but none has sufficient depth for large vessels. Heatons Wharf is used chiefly by vessels out of commission and is comparatively inactive. Steamboat Dock is controlled by the New England Steamship Co., a subsidiary of the railroad, and is used exclusively by the vessels of that company. The other terminals are used chiefly for receiving coal and lumber. Middle and Pocket Docks are used exclusively for coal and are equipped with modern appliances that have an aggregate capacity for handling 4,500 tons per day.

**Type of wharf construction.**—The terminals are, for the most part, piers of pile and timber construction.

**Port administration.**—There are no port authorities other than a harbor master and a State board of harbor commissioners. The harbor master is appointed by the governor for a term of three years and receives a salary of $300 a year. He performs the usual duties of that office.

The State board of harbor commissioners for New Haven Harbor consists of six members appointed by the governor for a term of five years. They serve without compensation, but employ a clerk who receives a nominal salary. The power of this board is expressly limited to the "general care and supervision of New Haven Harbor and its tidewaters and of all the flats and lands flowed thereby, in order to prevent and remove unauthorized encroachments and

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causes of every kind which are liable to interfere with the full navigation of said harbor or in any way injure its channels or cause any reduction of its tidewaters."

In addition to these officials, there is another State board called the Connecticut Rivers, Harbors, and Bridges Commission, established in recent years. The principal purpose of this board, which is also appointed by the governor, is to report on the condition of the rivers and harbors of the State and to make recommendations for the improvement thereof. It is this board, augmented by the governor and the mayor of New London, that has charge of the construction of the new State pier at New London. In case this board should recommend the building of a State pier at New Haven and the legislature should approve their recommendation, the plans, construction, maintenance, and operation of the pier would be in the hands of this State board.

**Port charges.**—*Pilotage.*—Pilots are not generally taken, except by vessels subject to compulsory pilotage (foreign and U. S. registered vessels drawing 9 feet and over, if spoken). There are no fixed fees for pilotage, but the usual charges are as follows for inward pilotage: Vessels of less than 9 feet draft, 75 cents per foot; 9 to 12 feet, $1; 12 to 14 feet, $1.50; 14 feet and upwards, $2. The outward rate is one-half the inward.

*Towage.*—Lumber schooners pay 8 cents per 1,000 feet b. m. for towage to points below the bridges and an additional 8 cents per 1,000 feet to points beyond. Coal barges pay from 2 to 3 cents per ton of cargo.

*Harbor dues.*—No harbor dues are collected at New Haven.

*Dockage.*—At the terminal maintained by the city, which is practically the only public terminal, the charges for dockage are 1 cent per day per ton of register tonnage for loaded sailing vessels and one-half cent per ton per day for light sailing vessels, for those unloading to lighters, for those occupying outside berth, and for those awaiting convenience. Barges and boats using the city wharf pay 1 cent per ton per day if not awaiting convenience and $1 per day while awaiting convenience if loaded and 50 cents per day if light. For steamboats carrying local excursion parties no charge is made.

*Wharfage.*—The following is a list of rates for wharfage on goods and merchandise handled at the city pier:

| Articles. | Rates. | Articles. | Rates. |
|---|---|---|---|
| | Cents. | | Cents. |
| Acids, per carboy | 2 | Dyewoods, per ton | 12½ |
| Ammunition, per case | 1 | Earthenware, do | 12½ |
| Ashes, per ton | 7 | Excelsior, in bales, each | 2 |
| Barrels, empty: | | Fertilizer, per ton | 12½ |
| Flour, each | ½ | Fish, per 100 pounds | 1 |
| Oil, do | 1 | Flour, per barrel | 1 |
| Barytes, per ton | 7 | Flour in bags, per 100 pounds | ½ |
| Bones, do | 12½ | Grain and feed, in bags, per ton net | 12½ |
| Brick: | | Gravel, per ton | 7 |
| Building, per 1,000 | 12½ | Grindstones, do | 12½ |
| Fire, do | 15 | Gunstocks, per 1,000 | 25 |
| Hollow, do | 10 | Hair, per ton | 12½ |
| Paving, do | 12½ | Hay, per bale | 2 |
| Cabbages, per 100 bushels | 30 | Hoop poles, per 1,000 | 25 |
| Carboys, empty, each | ½ | Horns, per ton | 12½ |
| Cement, per barrel | 1 | Ice, do | 7 |
| Clay, per ton | 7 | Iron, all kinds, do | 12½ |
| Coal, do | 7 | Junk, do | 12½ |

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| Articles. | Rates. | Articles. | Rates. |
|---|---|---|---|
| | *Cents.* | | *Cents.* |
| Lumber.....per 1,000 feet.. | 10 | Plaster.....per barrel.. | 1 |
| Lumber: | | Do.....per ton.. | 7 |
| Lath.....per 1,000.. | 2 | Potatoes.....per 100 bushels.. | 30 |
| Pickets.....per 1,000 feet.. | 10 | Powder.....per keg.. | 1 |
| Piles.....each.. | 8 | Do.....per half barrel.. | 1½ |
| Poles, under 4 inches.....per 1,000.. | 12½ | Rags.....per ton.. | 15 |
| Shingles.....do.... | 2 | Railroad ties.....each.. | ½ |
| Staves.....do.... | 12½ | Salt.....per ton.. | 7 |
| Telegraph poles.....each.. | 8 | Do.....per sack.. | 1½ |
| Manure.....per ton.. | 7 | Sand.....per ton.. | 7 |
| Melons.....per 1,000.. | 20 | Shooks.....each.. | 1 |
| Molasses.....per barrel.. | 3 | Slate.....per ton.. | 12½ |
| Do.....per hogshead.. | 10 | Spikes.....per keg.. | 1 |
| Do.....per tierce.. | 6 | Stone.....per ton.. | 12½ |
| Nails.....per keg.. | 1 | Stoneware.....do.... | 12½ |
| Oil.....per barrel.. | 3 | Sugar.....per barrel.. | 3 |
| Onions.....per 100 bushels.. | 30 | Do.....per hogshead.. | 12½ |
| Oranges.....per crate.. | 1 | Do.....per tierce.. | 6 |
| Ore.....per ton.. | 7 | Wood.....per cord.. | 6 |
| Oysters.....per 100 bushels.. | 50 | | |

*Handling.*—The following is a list of handling charges at the city pier:

| Items. | Charges. | Items. | Charges. |
|---|---|---|---|
| | *Cents.* | | *Cents.* |
| Guying.....per ton.. | 1 | Shoveling: | |
| Hoisting coal and general merchandise .....per ton.. | 10 | Ashes.....per ton.. | 10 |
| | | Barytes.....do.... | 10 |
| Hoisting pig iron.....do.... | 7½ | Coal.....do.... | 8 |
| Loading brick.....do.... | 15 | Salt.....do.... | 8 |
| Loading or unloading: | | Sand.....do.... | 8 |
| Asphalt paving blocks.....do.... | 30 | Weighing.....do.... | 4 |
| Grindstones..... | (a) | Use of engine and engineer....per day.. | $10.00 |
| Lumber.....per M feet.. | 25 | | |
| Merchant iron..... | (a) | | |
| Pig iron.....per ton.. | 7½ | | |

a Actual cost of handling.

## NEW LONDON, CONN.

The port of New London comprises the lower 3 miles of the Thames River and is located about 120 miles east of New York. The Thames, which is a tidal stream, has at New London a navigable width of one-quarter to 1¼ miles and a minimum usable depth of 26.5 feet at mean low water in the main channel from Long Island Sound to the railroad drawbridge which crosses the river above the present dock front. Above this bridge to Allyns Point, a distance of 10 miles, the Thames has a depth of 20 feet and from Allyns Point to the city of Norwich, which is 15 miles above New London, a depth of 14 feet.[a]

The principal docks at New London are about 3 miles from Long Island Sound and are reached by a ship channel 400 feet or more in width and 23 feet or more in depth. The water in New London Harbor is, except in a few spots, 30 feet or more in depth. The mean range of tide in New London Harbor is 2.5 feet.

**Railroads.**—New London is served by two systems of railroads, the New York, New Haven & Hartford Railroad and the Central Vermont Railway. The city is on the main, or shore, line of the New Haven Railroad and is the Sound terminus of a branch extending from

a Report, Chief of Engineers, U. S. Army, 1914, pp. 143-144.

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Fitchburg and Worcester, Mass. The Central Vermont Railway, which is a part of the Grand Trunk Railway system, extends through Connecticut, western Massachusetts, and Vermont to Montreal, Canada, and gives the Grand Trunk system a deep-water terminus only 115 miles from New York City.

**Steamship lines.**—A number of regular coastwise steamship lines call at New London. They are as follows:

Central Vermont Line, which is owned by the Central Vermont Railway and operates 1 freight boat daily in each direction between New York and New London.

Montauk Steamship Co., which operates between New London and the ports of Greenport and Sag Harbor, on Long Island, and maintains a schedule of 2 ships per day in summer and 3 ships per week in winter.

New England Steamship Co. (Norwich Line), which maintains a combined freight and passenger service of 1 boat in each direction daily between New York, New London, and Norwich.

Norwich & New York Propeller Co., known as the Chelsea Line, which operates a triweekly service between New York, New London, and Norwich.

The New England Steamship Co. maintains a daily service in summer between Norwich, New London, and Block Island, while the Fishers Island Navigation Co. operates pleasure boats during the summer season between New London and Fishers Island. In addition, steamers of the Quartermaster Department of the United States Army make daily trips carrying supplies and passengers to the near-by forts. The river is used also by a ferry, which makes frequent trips daily between New London and Groton, a small town immediately opposite New London.

**Commerce of the port.**—The total water-borne commerce at the port of New London in the calendar year 1914 was 824,095 short tons, valued at $102,871,516. In the year 1913, which was a more nearly normal trade year and is, therefore, preferable for purposes of discussion, it amounted to 924,127 short tons, valued at $112,332,489. The inbound traffic amounted to 765,307 tons, valued at $70,671,787, and the outbound traffic to 158,820 tons, valued at $41,660,702.[a] Practically all of the commerce at this port is domestic trade, the value of the foreign trade in 1913 being only $64,243.

The principal item in the trade at New London is that reported as "merchandise (steamboat freight)." In 1913 this item accounted for nearly two-thirds of the tonnage (580,045 tons out of total of 924,127 tons).

The principal commodities included under the head of merchandise are groceries, provisions, dry goods, hardware, machinery, hides, etc. Coal is the next item of importance. In 1913, 277,957 short tons of coal were brought into New London Harbor by water. In addition, 16,848 tons of paving blocks and 16,016 tons of lumber were included in the commerce of the port in that year, as well as various other bulk commodities.

**Extent and ownership of water front.**—The main portion of the water front on the lower Thames River is located on the western, or New London, side, south of the present New York, New Haven & Hartford Railroad bridge. The eastern, or Groton, side of the river is, on the whole, too hilly to permit of extensive development for water terminals, while the river north of the bridge has a depth of only 20 feet.

[a] Report, Chief of Engineers, U. S. Army, 1914, p. 1649; idem, 1915, p. 2080.

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The section of the New London water front south of the railroad bridge has a frontage of about 16,666 feet, of which 7,083 feet are used for terminals and 6,250 feet for residential purposes, while 3,333 feet are unimproved. Of the frontage improved by terminals, the city of New London owns only about 100 feet, while the State of Connecticut owns or controls by 77-year lease a tract having a frontage of 430 feet and an area of about 6 acres. The New York, New Haven & Hartford Railroad and the Central Vermont Railway own a large portion of the principal frontage. A large amount of frontage is used by coal and lumber companies. The United States Government occupies two sections, one used by the Quartermaster Department and the other by the Lighthouse Service.

North of the present bridge the State of Connecticut owns or controls, by 77-year lease with option to purchase, a total frontage of 4,200 feet which borders a channel having a depth of 20 feet at mean low water. Approximately 1,000 feet of this frontage is being filled in with earth excavated from a hill in the rear of the State pier that is being constructed south of the bridge, and a tract of 16 acres is thereby being created. It is estimated that the entire tract north of the bridge will, when filled out to a bulkhead line now established, contain about 100 acres.

**Terminals.**—The most important and most active terminals are those controlled by the two railroads, although each uses only a small part of the frontage owned by it.

The principal terminal of the Central Vermont Railway consists of a pier with a length of 1,084 feet on one side and 816 feet on the other. The pier was built in 1875 and is solid-filled with stone walls for bulkheads. It has a width of 222 feet at the water end, although for the most part its width between the stone walls is 152 feet, this width being extended to 168 feet by the pile and timber wharves at each side.

One side of this pier faces the entrance to Winthrop Cove and the other faces the State pier now under construction. The slip between the two piers is about 265 feet in width. Not more than a 23-foot depth of water can be secured on either side of the Central Vermont Railway pier, the construction rendering it impossible to dredge to a greater depth.

The freight boats of the Central Vermont Line use one side of this pier and tramp steamers the other. The pier is equipped with a coal elevator and has 10 tracks, one of which extends through the small freight shed or warehouse of frame construction near the end of the pier. In the rear of the pier are the extensive freight yards of the railroad.

The condition of the pier is none too good. Attempts to deepen the slip on the eastern side by dredging undermined a part of the pier and caused a part of the wall to fall in.

On the main harbor the Central Vermont Railway owns a continuous tract extending north from the Union Station a distance of about 800 feet. The first 155 feet of this frontage is improved by an excellent timber wharf which is not actively used, while the remainder has an old pile wharf and an old transfer shed which are in a dilapidated condition.

The terminals of the New England Steamship Co., a subsidiary of the New York, New Haven & Hartford Railroad Co., are on the inside

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channel adjacent to the Union Station and consist of one pier, which is 500 feet long and 100 feet wide. The pier is of pile and timber construction and has a depth of 20.5 feet alongside. It has a timber shed covered with galvanized iron, and is used by the freight and passenger steamers of the navigation company. Only 800 feet of the lineal frontage owned by the New Haven Railroad system is improved in this manner.

The Chelsea line of steamers owns its own pier, which has a frontage of 300 feet on the main harbor. At the end of the pier there is a small receiving shed of frame construction and in the rear two 2-story brick warehouses, used apparently for the storage of bales of old rags.

Coal companies occupy a considerable amount of frontage on the main harbor. These companies have modern coal hoists for elevating coal from vessels. The only industrial plant on the water front is an electric power plant.

The only public terminal now in use consists of the free public landing at the head of a narrow slip near the Union Station. It is used only by small pleasure craft, excursion boats, etc.

Probably before the close of the present year the pier which the State of Connecticut is building will be completed. This pier will be 1,020 feet long and 200 feet wide. The center of the pier will be a solid fill between thick granite walls 100 feet apart. On either side will be a fender wharf, 50 feet wide, of creosoted-pile construction, with platform or deck of premolded, reinforced concrete units, resting on cast-iron plates. The surface of the fender wharf, as well as that of the middle section, will be of asphalt.

Plans have been made for the erection of reinforced-concrete warehouses on this pier. These warehouses will be built in units and will be one story in height at first, with walls strong enough to permit of one or two additional stories that may be built later. The first unit will be 300 feet in length and 100 feet in width and will cover the middle section of the pier. Before the fill is made, piles will be driven in the middle section so as to permit the erection of heavy superstructures.

Through the center of the pier there will be two depressed tracks, and in addition one track will extend on either side close to the edge of the pier for a distance of 500 feet from the shore bulkhead. The State will own and control these tracks as well as a distribution yard containing about 5 miles of track. Direct connection will be made with the Central Vermont Railway, while an indirect connection with the New Haven Railroad will be made at the outset over the tracks of the Central Vermont Railway.

In the rear of the pier the State owns a tract of about 6 acres. Considerable excavating will be necessary to level off this land, and the earth will be used in reclaiming a tract of 18 acres on part of the State's holdings to the north of the railroad bridge.

The construction of the pier is such as to permit dredging in the slips to a depth of at least 35 feet. Between this pier and the Central Vermont Railway pier there will be a slip 265 feet wide, and between this pier and a second pier that the State plans to build there will be a slip 300 feet in width. Granite bulkheads extending about one-half of the width of these slips have already been constructed.

One million dollars were appropriated for this work. A little more than $100,000 has been expended in acquiring frontage and land, and $500,000 will be spent in building the substructure of the pier, including floor surface, and the foundations for warehouses, in dredging slips,

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building bulkheads at the end of the slips, in leveling adjoining shore and, in laying out a marginal way, and in reclaiming the 18-acre tract. The balance will be required for warehouse, tracks, handling equipment, and engineering expenses.

Tentative plans of the Connecticut Rivers, Harbors, and Bridges Commission call for two additional piers adjoining the one now being constructed. Pier 2 would be 900 feet long and 125 feet wide and Pier 3, 650 feet in length and 125 feet in width, with slips 300 feet in width separating the three piers. The frontage to the north of the bridge now owned by the State would provide for a second pier, but for the third pier it would be necessary to acquire the adjoining property of the Valvoline Oil Co.

**Type of wharf construction.**—This subject has been fully covered in the description of the principal terminals.

**Port administration.**—So far as the municipal government is concerned there is no port administration. The free public landing owned by the city is under the control of the public-property committee of the court of common council, but practically runs itself. There is a harbor master, but he is a State official who is appointed by the governor for a term of years.

The water-front development now being carried on by the State is under the control of the Connecticut Rivers, Harbors, and Bridges Commission. This commission, created by act of legislature in 1911, consists of five members appointed by the governor for terms of six years. They serve without salary. The act requires that one "shall be a capable and experienced civil engineer of at least 10 years' practice," one a lawyer of good standing, and the others practical business men.

The jurisdiction of this commission is State-wide. For the work of construction and operation of the terminals at New London the governor of Connecticut and the mayor of New London are ex officio members of the commission.

The powers and duties of this commission, with respect to the harbor of New London as fixed in the organic act (Connecticut Senate joint resolution No. 216, entitled "Concerning steamship terminals at New London," and approved July 25, 1911), are stated in section 1 to be as follows:

*Resolved by this assembly:* Section 1, That the commissioners of rivers, harbors, and bridges, hereinafter called the commissioners, shall have power, on behalf of the State, to acquire, own, construct, maintain, and operate docks, wharves, piers, quays, and dikes, canals, slips, and basins, or any other appropriate harbor facilities, sheds, warehouses of all kinds, vaults, railroad tracks, yards, terminals, and equipment, and all other lands and water transportation facilities in the city of New London and the towns of Waterford and Groton necessary to expedite the interchange of rail and water traffic; and for the purpose of carrying out the provisions of this resolution the governor and the mayor of the city of New London shall be, ex officio, members of the commission of rivers, harbors, and bridges.

The commission has also the right of eminent domain (secs. 2 and 3) and the power of fixing and regulating rates and charges for the use of the public terminals.

**Port charges.**—*Pilotage.*—The following is a list of pilotage charges recently authorized for this port by the judge of the superior court in Norwich:

Two dollars per foot draft for vessels drawing not more than 12 feet and 25 cents additional for each foot of draft up to 19 feet, and $4 per foot draft for any vessel drawing 20 feet or more. These rates are the same for pilotage inward and for pilotage outward.

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*Towage.*—The following is the schedule of charges made by Thames Tow Boat Co. and the T. A. Scott Co. (Inc.) for towing ve to and from any of the docks at New London:

| Capacity tonnage of vessel. | Inward (loaded). | Outward (light). | Capacity tonnage of vessel. | Inward (loaded). | Ou (l |
|---|---|---|---|---|---|
| 500-600 | $5.00 | $3.00 | 1,000-1,500 | $10.00 | |
| 600-700 | 6.00 | 3.00 | 1,500-1,800 | 15.00 | |
| 700-800 | 7.00 | 3.00 | 1,800-2,000 | 20.00 | |
| 800-1,000 | 8.00 | 4.00 | 2,000-3,000 | 25.00 | |

An extra charge of $2 each way is made for towing to doc Shaw's Cove because of the necessity of passing through a brid the entrance to the cove.

*Harbor dues.*—No harbor dues are collected at this port.

*Dockage.*—There are no public commercial wharves. The reg lines of steamships use their own terminals. Other vessels ente the port are accommodated without charge for dockage at the wha of the coal companies. At the Central Vermont Railway pie dockage charge is made for vessels having cargoes for shipment ove Central Vermont Railway or for delivery in New London, but a ch of 50 cents per day is made for empty barges tying up along this and $1 per day for loaded barges.

*Wharfage.*—The Central Vermont Railway makes a wharfage cha of 20 cents per ton on all cargoes discharged on its pier for city de ery, but makes no charge on cargoes shipped over its rails.

The T. A. Scott Co. (Inc.) makes a wharfage charge of 6 cemts to cents per ton, according to the commodity handled, for cargoes charged at its dock, with an allowance of 10 days free time.

*Switching.*—A charge of $2.50 per car is made for switching.

## NEW YORK, N. Y.

The port of New York is preeminent among the ports of the Unit States and ranks among the greatest ports of the world. Its suprem acy among the ports of this country is attested by the fact that, on th average, about three-fifths of the imports and about three-eighths the exports of the United States pass through New York Harbo every year.

The port of New York is first in the world in respect to the net register tonnage of vessels entering and clearing the port and second only to London in the value of foreign trade, according to the data for the latest available normal years for the several ports. These statistics are shown in the following table taken from the Statistical Abstract of the United States for 1914 (pp. 702-704):

| Ports. | Year. | Value of foreign trade. | | | Net register tonnage of vessels. | |
|---|---|---|---|---|---|---|
| | | Imports. | Exports. | Total. | Entered. | Cleared. |
| New York | 1914 | $1,040,380,526 | $864,546,338 | $1,904,926,864 | 15,767,547 | 15,421,394 |
| Hamburg | 1913 | 1,084,324,537 | 817,274,716 | 1,901,599,253 | 14,185,000 | 14,440,000 |
| London | 1913 | 1,235,503,560 | 768,482,933 | 2,003,986,493 | 13,725,156 | 11,403,908 |
| Liverpool | 1913 | 854,020,794 | 950,368,220 | 1,804,398,014 | 12,054,056 | 11,209,415 |
| Antwerp | 1912 | 625,991,233 | 588,734,262 | 1,214,725,495 | 11,483,214 | 11,453,859 |
| Rotterdam | 1912 | (a) | (a) | (a) | 11,552,119 | 11,532,619 |
| Hongkong | 1912 | (a) | (a) | (a) | 12,179,035 | 12,100,365 |

a Not reported.

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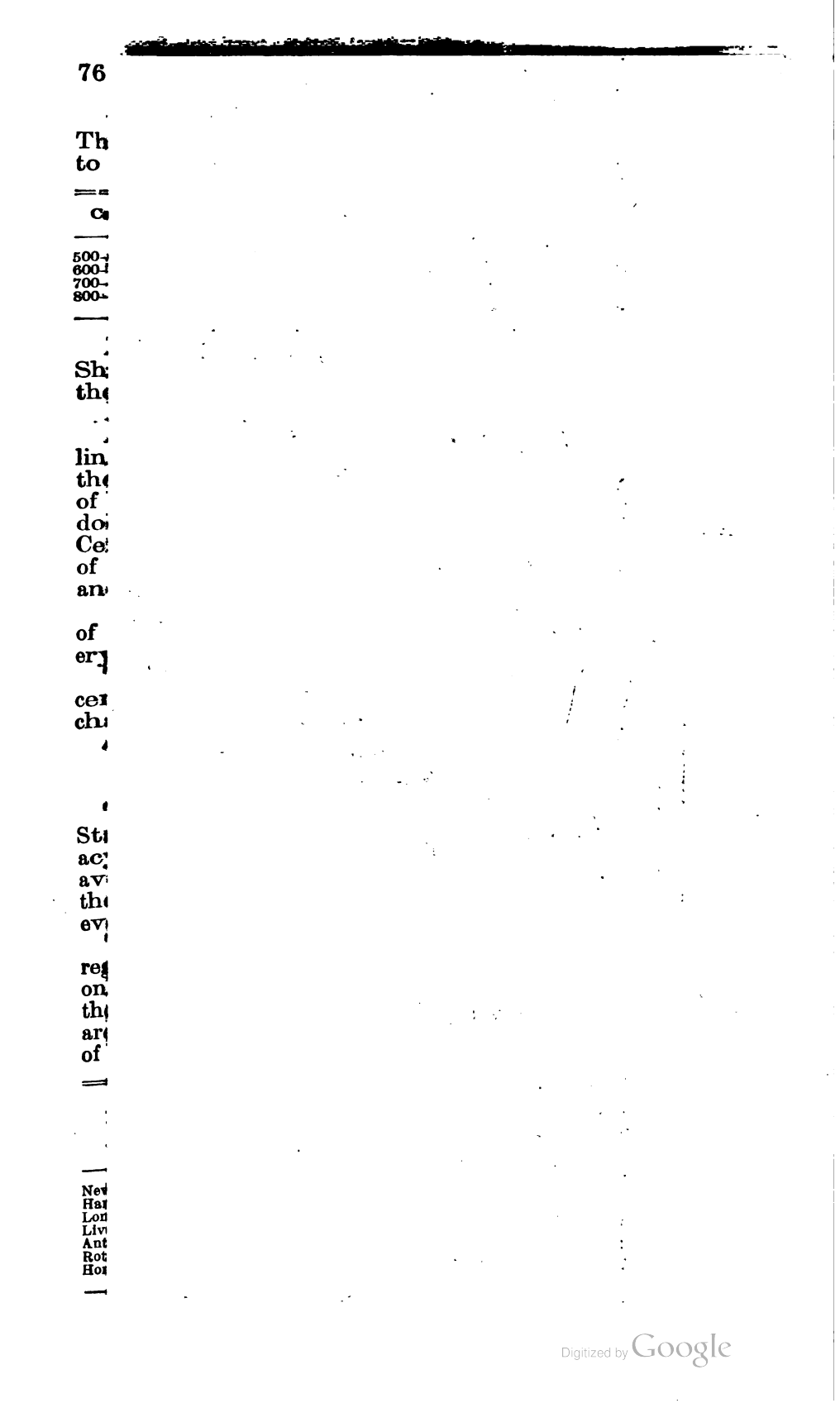

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The boundaries of the port of New York are defined in no statute. The limits of the New Jersey section of the port, however, have been indicated by an act passed by the State Legislature of New Jersey entitled, "An act requiring municipalities of this State situated on the waters included within the port of New York, that is to say, the North River, the New York Bay, the Kill Van Kull, the Arthur Kill, the Raritan Bay, the Hackensack and Passaic Rivers, and the Newark Bay, where the tide ebbs and flows, to report improvements."

It will be observed that the waters mentioned in this New Jersey statute include only those waterways which lie in whole or in part within the boundaries of that State. It is accepted, however, that the East River, Harlem River, Bronx River, Westchester Creek, East Chester Creek, Flushing Bay, Flushing Creek, Newtown Creek, Wallabout Channel, Gowanus Bay, Gowanus Canal, and Jamaica Bay, which lie within the limits of the city of New York, are parts of the port of New York.

The generally accepted boundaries of the port are shown in the map opposite page 76. This map was prepared by the Merchants' Association of New York in 1914, and shows not only the various waterways composing the port but also the principal rail and steamship terminals.

*Entrance channels.*—Comparatively little is known by the public at large as to the general character of the numerous waterways that are parts of the harbor of New York. It may be well, therefore, to describe, in terms of location and dimensions, the entrance and connecting channels and the various rivers, creeks, bays, and inlets.

New York Bay is the principal entrance to New York City. It is divided into two parts, the Lower Bay and the Upper Bay, by the Narrows, a passage about five-eighths of a mile wide at its narrowest part. The entrance to the Lower Bay is between Sandy Hook on the south and Rockaway Point on the north and is about 6 miles wide. The Upper Bay extends from the Narrows to the Battery.

The principal entrance channels to the harbor of New York are the Ambrose Channel and the Main Ship-Bayside-Gedney Channel.

Ambrose Channel, which is the newer and more important channel, was completed April 17, 1914. It has a comparatively straight course in a northwesterly and then northerly direction from deep water in the ocean through the Lower Bay. It is 38,000 feet in length and 2,000 feet in width, and has a depth of 40 feet at mean low water. The mean range of tide is about 4.5 feet.

Main Ship-Bayside-Gedney Channel is the route formerly used by deep-draft vessels. It extends westward past Sandy Hook and then northward through the Lower Bay. It has a depth of 30 feet at mean low water and a nominal width of 1,000 feet, which has decreased in places to 500 feet.[a]

The Main Ship Channel in the Upper Bay leads between Jersey Flats and Gowanus Flats and has depths of 30 to 90 feet and a width of about one-half mile.[b]

Within the harbor there are several channels connecting the different sections. Bay Ridge, Red Hook, and Buttermilk Channels lie in Gowanus Bay along the Brooklyn shore of the Upper Bay and form an easterly channel that extends from the Narrows to East River and is separated from the Main Ship Channel by a broad shoal off

[a] Coast Pilot, Atlantic Coast, Part IV, Point Judith to New York, 1915, p. 188. [b] Idem, p. 191.

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Gowanus Bay and by Governors Island. By means of these channels the extensive terminals of the Bush Terminal Co. and of the New York Dock Co., as well as the municipal terminals in South Brooklyn, are directly accessible for large ships and have easy communication with the other sections of the inner harbor.

Bay Ridge Channel has a minimum depth of 35 feet at mean low water for its full width of 1,200 feet and of 40 feet for the middle 800 feet of that width. Red Hook Channel is approximately 1,200 feet wide and has a minimum available depth of 33 feet at mean low water throughout its length and of 40 feet through about one-fifth of its length. The combined length of these channels is about 4.5 miles and the mean range of tide is about 4½ feet. Buttermilk Channel has a general depth of 30 feet, but at certain places the depth does not exceed 27 feet. The channel is broad, having at its narrowest point a width of about 800 feet.

*Rivers, creeks, and bays.*—The Hudson (North) River empties into Upper New York Bay at the Battery, the southernmost point of Manhattan Island. The width of the river between established pierhead lines is 3,900 feet at the Battery and gradually decreases to 2,750 feet between Castle Point, N. J., and West Fourteenth Street, New York City, and to 2,725 feet opposite West Fifty-ninth Street.

A vessel drawing 40 feet can be carried at mean low water up to West Nineteenth Street through the eastern, or New York, side of the river; from West Nineteenth to about West Fiftieth Street, through the western, or New Jersey, side; and between West Fiftieth and West Seventy-fifth Streets, in the middle of the river. The mean range of tide at the Battery is 4.2 feet.

East River is a tidal strait about 16 miles long and from 600 to 4,000 feet wide, exclusive of bays and estuaries, and extends from the Battery in New York City to Throgs Neck at the head of Long Island Sound. This river separates the Boroughs of Manhattan and the Bronx from the Boroughs of Queens and Brooklyn.

The Chief of Engineers of the United States Army reports that "on June 30, 1914, the through main channel from the Battery to Long Island Sound had a least depth of 30 feet at mean low water and a least width of 550 feet, except in Hell Gate, off Hallets Point, where the width is but about 200 feet for a stretch of about 300 feet."[a]

The mean range of tide in the East River is 4.4 feet at the Battery, 4 feet at the Brooklyn Navy Yard, and 6.6 feet at the east entrance to Hell Gate.

Harlem River and Spuyten Duyvil Creek together form a waterway about 8 miles in length which extends from the East River to the Hudson River and separates the Borough of Manhattan from the Borough of the Bronx. The East River entrance to the Harlem River is about 8½ miles by water northeast of the Battery and the Hudson River entrance to Spuyten Duyvil Creek is about 13½ miles by water north of the Battery.

The improved channel in Harlem River has a width of 150 to 400 feet and a depth of 15 feet at mean low water except at Macombs Dam Bridge, where ledge rock projects at a point 12 feet below mean low water.

Bronx River is a short and narrow stream that empties into a shallow bay or estuary on the East River at Hunts Point, about 11

[a] Report, Chief of Engineers, U. S. Army, 1914, p. 198.

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miles northeast of the Battery. The navigable portion of the river consists of a channel extending from its mouth to a dam at East One hundred and seventy-seventh Street. This channel is about 3¼ miles long and from about 50 to 300 feet wide and has a depth of only 3 feet at mean low water in the lower section. The mean range of tide in the Bronx River is about 7 feet in the estuary and 6 feet at the dam.[a]

Westchester Creek is a small stream lying wholly within the limits of the city of New York. This stream extends northward from an estuary in the north shore of East River about 14 miles northeast of the Battery. The estuary is about 1 mile long and from 500 to 3,000 feet wide. The portion of the creek now under improvement is 2⅔ miles long from deep water in the East River and from 110 to 500 feet wide. The lower section has a depth at mean low water of 8 feet, while the upper section has a mean depth of 6 feet.

East Chester Creek is a shallow stream that empties into East Chester Bay on the north shore of Long Island Sound about 12 miles west of the Connecticut State line and about 21 miles northeast of the Battery. The lower 2 miles of the navigable portion of this stream lie wholly within the limits of the city of New York and have a depth of only 3 feet at mean low water, while the upper section has a depth of about 5 feet.

Flushing Bay is on the north shore of Long Island, about 14 miles from the Battery. The bay is about 1 mile wide and 2 miles long. Flushing Creek, which flows into the head of the bay, is a tidal stream navigable for a distance of about 3.5 miles from its mouth. The total length of dredged channel through the bay and the creek is about 5½ miles and the mean low-water depth is about 6 feet in the lower portion of the channel and about 7 feet in the upper portion. The mean range of tide is about 7.1 feet.

Newtown Creek is the inlet of the East River that separates for a distance of about 4 miles the Boroughs of Queens and Brooklyn. The improved channel has a width of about 125 feet and an average depth of about 14 feet at mean low water. The mean range of tide is about 4½ feet.

Wallabout Channel is a channel in Wallabout Bay, an inlet of the East River adjacent to the United States navy yard in Brooklyn. The channel consists of a waterway extending in a half circle around the inside of the island known as Cob Dock and is divided into two parts by a stone causeway connecting the mainland with Cob Dock. The eastern section of the channel is about 2,000 feet long and from 250 to 350 feet wide and has a depth of about 20 feet at mean low water. At the head of Wallabout Channel are two bodies of navigable water, Kent Avenue Basin and Wallabout Basin, which are 2,200 feet long and 1,300 feet long, respectively.[b]

Jamaica Bay is situated on the south shore of Long Island and lies wholly within the limits of the city of New York. It is about 8 miles long and 4 miles wide and covers an area of approximately 32 square miles. The bay is connected with the ocean at Rockaway Inlet by a shifting channel having a least depth over the bar of about 13 feet at mean low water. The bay contains numerous small low-lying islands. A channel 2½ miles long is now under improvement by joint action of

[a] Report, Chief of Engineers, U. S. Army, 1914, p. 189.
[b] Idem, p. 258.

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the Federal Government and the city of New York. The United States is to provide and maintain the entrance channel and the city is to dredge the channel within the bay, to bulkhead the shores of the bay, and to fill behind the bulkheads. On June 30, 1914, the entrance channel had been completed to a width of 500 feet and a depth of 18 feet at mean low water.

*The New Jersey portion of the harbor.*—Newark Bay is a large estuary extending from the confluence of the Passaic and Hackensack Rivers south to Staten Island, a distance of about 6 miles. It is about 1½ miles wide. At Staten Island the bay is connected on the east with Kill Van Kull and on the west with Arthur Kill. The navigable channel in the bay has a depth of 18 to 19 feet at mean low water and the range of tide is about 5 feet.

Passaic River is a tidal stream which is navigable for vessels drawing 6 feet of water as far as the city of Passaic, 16 miles above its mouth. In the lower portion of the river the depth of the navigable channel ranges from 18 feet at the mouth to 10 feet at a point several miles above.

Hackensack River is a tidal stream which merges with the Passaic River at the head of Newark Bay.

Arthur Kill (Staten Island Sound) separates Staten Island from New Jersey. It is about 12 miles long. This channel, with the lower end of Newark Bay and the Kill Van Kull, forms the inland waterway between New York and New Jersey, the boundary between the two States following the center of the waterway. Vessels drawing 21 feet can be taken at mean low water into Newark Bay via Lower New York Bay, Raritan Bay, and Arthur Kill.

Kill Van Kull, a connecting waterway about 3 miles in length, lies along the northern shore of Staten Island and extends from the lower end of Newark Bay to Upper New York Bay. Vessels having a draft of 30 feet can be brought at mean low water into Newark Bay through Upper New York Bay and the channel in Kill Van Kull.

Raritan Bay lies at the southern end of Staten Island and forms the western portion of Lower New York Bay. Its greatest length from north to south is about 5 miles and from east to west about 7 miles. The Raritan River empties into the bay at its western end and the Arthur Kill extends northward from its western end. Vessels enter the bay by way of the Main Ship-Bayside-Gedney Channel, but a draft of not more than 19 feet at mean low water can be carried through the dredged channels at the head of the bay.

Raritan River empties into Raritan Bay at Perth Amboy. Vessels having a draft of 10 feet of water can be carried to New Brunswick, a distance of about 12 miles, through dredged channels cut through the shoaler portions.

Elizabeth River is a small stream that empties into the Arthur Kill near its junction with Newark Bay. The navigable channel in the lower portion of the river has a depth of 7 feet at mean low water for a distance of about 1½ miles.

**Railroads.**—The port of New York is served by 13 principal railroads. Only one, the New York Central, has freight terminals served by all-rail connections in the Borough of Manhattan. The New York, New Haven & Hartford Railroad has freight terminals in the Borough of the Bronx; the Baltimore & Ohio Railroad, on

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Staten Island; and the Long Island Railroad, on Long Island. The remaining railroads have their tidewater terminals on the New Jersey side of the harbor and include the following: Central Railroad of New Jersey; Delaware & Hudson Railroad; Delaware, Lackawanna & Western Railroad; Erie Railroad; Lehigh Valley Railroad; New York, Ontario & Western Railway; Pennsylvania Railroad; Philadelphia & Reading Railway; and West Shore Railroad.

Among the lesser railroads of the port is the New York Connecting Railroad, which is now under construction and is owned jointly by the Pennsylvania and the New York, New Haven & Hartford Railroads. This railroad will, by means of its connection with the Long Island Railroad, extend from Bay Ridge in a northerly direction through Brooklyn to the East River at Hell Gate, where a bridge with piers on Wards Island and Randalls Island is being erected. Connection with the New York, New Haven & Hartford Railroad will be made in the Bronx.

The Bay Ridge terminal of the Long Island Railroad, which is now under construction, will be directly across Upper New York Bay from the Greenville terminal of the Pennsylvania Railroad at Jersey City. Since the distance between these terminals is only about 3 miles, the interchange of freight between the Pennsylvania and the New York, New Haven & Hartford systems will be facilitated. At present this freight must be floated from Greenville terminal to Mott Haven, a distance of more than 13 miles, a part of which is through the swift currents of the East River and Hell Gate.

*Marginal railroads.*—Other railroad terminals in the Brooklyn section of the port include those of the Brooklyn Eastern District Terminal and the Jay Terminal.

The following terminal railways are located along the New Jersey water front:

The Hoboken Shore Road, which is an electric line leased and operated by the Hoboken Manufacturers' Railroad Co., and has about 1.4 miles of main track extending from the piers of the Hamburg-American, North German Lloyd, and Holland-America steamship companies in Hoboken to Seventeenth Street, Weehawken, where connection is made with the Delaware, Lackawanna & Western, the Erie, the Lehigh Valley, the New York, Ontario & Western, the Pennsylvania, and the West Shore Railroads.[a]

The New Jersey Shore Line Railroad and the Erie Terminals Railroad, which run north from the terminals of the New York, Susquehanna & Western Railway at Weehawken to the Fort Lee Ferry at Edgewater.

The New Jersey Junction Railroad, which runs south from the Weehawken terminals of the Delaware, Lackawanna & Western, the Erie, and the Pennsylvania Railroads at Jersey City. This railroad is controlled by the New York Central system under long-term lease and has 4.78 miles of main track which is located at some distance back from the water front.

The Jersey City Belt Line Railroad and the National Docks Railway, which run back of Jersey City and extend to the National Docks at Black Tom Island.

The Undercliff Terminal & Warehouse Co., which will operate a half mile of switching track in connection with its terminal at Edgewater, where connection will be made with the Erie & West Shore Railroad. On September 22, 1914, the only business conducted by this company was lighterage and storage service in New York Harbor.[b]

The East Jersey Railroad & Terminal Co., which connects at East Twenty-second Street, Bayonne, with the Central Railroad of New Jersey. This company performs switching service for export and domestic deliveries to steamers and docks in New York Harbor, and operates 1.98 miles of track, of which 1.7 miles are leased.[c]

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[a] Poor's Manual of Railroads, 1915, pp. 1847–48. [b] Idem p. 520. [c] Idem, p. 357.



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*Proposed municipal marginal railroad in South Brooklyn.*—A very important addition to the facilities of the port of New York would be the proposed municipal freight railroad along the water front of South Brooklyn. According to present plans this railroad would be constructed by the city of New York and would probably be leased to and operated by a company in which all of the railroads serving New York Harbor would be privileged to have an equal share. This road would extend from Brooklyn Bridge south to Sixty-fifth Street, Bay Ridge, where connection wouid be made with the Long Island Railroad, and it is proposed that the city acquire and utilize as integral parts of this marginal railroad the four distinct and separate lines that are now located along the Brooklyn water front between Brooklyn Bridge and Sixty-third Street, three of which are operated by the New York Dock Railway and one by the Bush Terminal Railway Co.

The New York Dock Railway, which is controlled by the New York Dock Co. through stock ownership, owns three terminals, known as the Fulton, the Baltic, and the Atlantic, in addition to 10 miles of track divided into three sections that do not connect.

The Bush Terminal Railroad Co. owns and operates about 2 miles of railway from Twenty-eighth Street and Second Avenue to Sixty-third Street and First Avenue, in addition to a branch 0.74 mile in length extending to the municipal ferry at Thirty-ninth Street. This road connects, by traffic arrangement with the South Brooklyn Railway, with the Pennsylvania Railroad system at Sixty-fifth Street, and extends through the property of the Bush Terminal Co., serving the numerous warehouses and manufacturing plants located on the company's property.

The municipal freight railroad would join the several lines of the New York Dock Railway and would connect them with the Bush Terminal Railroad. The entire railroad would have a length of about 5½ miles. According to an estimate of the board of estimate and apportionment, the entire cost of the railroad, including right of way, classification yards, and other equipment, would be about $14,000,000.

*Method of conducting railroad business.*—An excellent description of the manner in which the railroad traffic is handled at the port of New York is given at pages 167–171 of the Fourth Preliminary Report of the New Jersey Harbor Commission. The following extracts are taken from that report:

> The railroad business on the New Jersey side of the harbor may be divided into three classes: (1) Shipment and receipt of freight to and from Manhattan Island and the other boroughs in New York; (2) shipment and receipt of freight to and from ships; (3) the transfer of railroad cars between the railroads terminating in New Jersey and the railroads terminating in New York.
>
> Considering first the business with Manhattan, practically no freight is sent on to Manhattan Island for transshipment, but all freight sent there is for consumption or fabrication on the island itself.
>
> The method of conducting the railroad business is usually as follows and this applies to freight:
>
> Trains are brought from the west and south to the railroad yards on the New Jersey shore, where the freight is separated for the various terminals in and about the harbor. Cars containing freight for individual terminals are placed on car floats and towed across the river into the slips between the piers in Manhattan, usually during the night and early morning. The freight from these cars is unloaded onto the piers by longshoremen and temporarily stored on the piers, awaiting the calling of the consignee. A certain time for storage must be allowed in order to give the consignee time to arrange for taking the freight away, but if the freight is not removed within a certain time the railroad companies send it to storage and charge the consignee with the ex-

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penses attendant thereto. The inbound freight to Manhattan is therefore handled on the piers.

The outbound freight for the New Jersey railroads is delivered to the bulkheads and bulkhead sheds in Manhattan by truck during the day, but principally in the afternoon; the trains on the floats are not usually sent out until the evening and the truckman naturally wishes to hold his truck until he can have it fully loaded. Usually the same time of delivery at destination can be made if the truck is on line at the bulkhead any time in the day prior to 4.30 p. m.; and the railroad company usually receives freight from all trucks which are on line waiting to make delivery at or before 4.30 p. m. There may be some exceptions to this, but it is the usual practice.

The freight in the bulkhead sheds is loaded onto the cars standing on the car floats in the slips. An effort is made to do as much classification of freight on the car floats as possible, and as many cars are usually brought over as can be accommodated in the slips, in order that as many points of destination may be provided for as possible. The car floats are towed across the river in the afternoon and evening on a regular schedule and the cars are then taken to the classification yards, where any reclassification is done that is necessary, and trains are made up to go out on a regular evening schedule.

The competition between the railroads, which at one time existed as to rates, has been eliminated; practically the only competition remaining is at the terminals, where inducements are made to encourage shipment by providing better facilities for the receipt and distribution of freight, and by making more rapid delivery at destination.

The railroad cars crossing the river on floats for this business are loaded only to an average of about 8 tons each, and some idea of the amount of water front of Manhattan which is used in this manner can be gotten when it is known that from 1,500 to 2,000 railroad cars on car floats occupy this water front every day.

The business which the railroad companies do with the ships is conducted in another manner from that described above. Practically all of the freight passing between the railroads and the ships is unloaded from cars at the railroad yards in New Jersey onto lighters, which are then towed alongside of the ships and the freight loaded directly into the ships, or the lighters are placed alongside of steamship piers, where the freight is discharged to the piers for storage until such time as it can be loaded into the ships. In the case of inbound freight the reverse process is employed. In no case, as far as can be observed, is it the general practice to take railroad cars on floats alongside of ships for direct loading and unloading, except in the banana trade, where it is done to a limited extent.

The transfer of railroad cars between the New Jersey railroads and the New England railroads is done by car floats, and * * * a number of cars are transferred on car floats to the terminal companies operating in the harbor.

There are some features in the railroad situation in New York Harbor which are of special interest to the business community. In the first place there is a "differential" rate against New York and favoring neighboring seaports, which is a matter which concerns the port as a whole; and, secondly, there is the system of "free lighterage" about the harbor, which concerns the various districts in the harbor.

*Railroad differential against port.*—As to the differential, in the early days of railroad and steamship transportation uniform rates, especially among the railroads, had not been established between the Middle West and the Atlantic coast, neither had uniform steamship rates been established between the United States and foreign ports. New York, with the largest business and better docking facilities, was given a lower rate by the steamship companies for water-borne freight than its rival ports, partly to encourage freight to pass through this port.

The railroad companies were reaching tidewater at various other ports on the Atlantic coast, where they could, even then, bring their cars closer to the ships than at New York and, at less expense to themselves, make transshipment. And further, in order to make a uniform rate between the Middle West and foreign ports, they instituted a rate to New York higher than the rate to other Atlantic seaports.

Later a uniform freight rate between Atlantic and foreign ports was established, but the railroad rate to New York has remained higher than to other adjacent seaports.

Applications have been made from time to time by the commercial interests in New York to have this railroad differential against New York removed, but this has not been accomplished and New York is handicapped in its railroad business in favor of Philadelphia, Baltimore, Norfolk, and other ports.

*Free lighterage.*—In the matter of free lighterage, the trunk-line railroads entered into an agreement whereby the cost of delivering freight by lighter within certain limits of New York Harbor would be absorbed in the through freight rate and the freight rate to any part of the harbor within the free lighterage limits would be the same as at the tidewater terminals on the New Jersey side of the harbor.

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*Free lighterage limits.*—The free lighterage limits of the port are indicated on the map opposite page 76 and may be described as follows:

On the New York side, from the Battery to One hundred and thirty-fifth Street.
On the New Jersey side, from Communipaw Avenue to Fort Lee (restricted to certain classes of freight).
On the East River, from the Battery to Jerome Avenue Bridge, including the Harlem River side of Wards Island and Randalls Island.
On the Brooklyn side, from Pot Cove, Astoria, to and including Newtown and Dutch Kills Creek and points in the Wallabout Canal west of Washington Avenue Bridge, and to Hamilton Avenue Bridge, Gowanus Canal, and to and including Sixty-seventh Street, South Brooklyn, at Bay Ridge.
Free cartage is generally allowed by the railroad companies between steamship terminals and railroad terminals on through shipments, and there has recently been an agitaion by the railroad companies to do away with this free cartage allowance.

Late in 1914 the railway companies operating lines which enter New York City from the west and the north filed tariffs, to become effective January 1, 1915, which proposed changes in their regulations governing charges and services in connection with the delivery and receipt of freight at that terminal. The effect of practically all of the proposed changes would have been to increase the charge for the service rendered, either by a direct increase in the rate or by the discontinuance or reduction of service rendered for the rate now in force. Upon protest by numerous individual shippers and shippers' organizations the operation of the proposed tariffs was suspended until May 1, 1915, and by a later order until November 1, 1915.[a]

A number of the increases and changes proposed by the railroad companies were approved by the Interstate Commerce Commission, while a number were disallowed. The net result probably will be to increase slightly the cost of handling freight at the port of New York.

**Steamship lines.**—It is difficult to compile a complete list of the foreign, coastwise, and local lines of steamships that call regularly at the port of New York. The number of lines is large and is almost constantly changing. Some lines have been entirely suspended during the war in Europe. Since, however, an enumeration of the lines that serve a port is an excellent index of the importance and general character of the port itself, lists of the principal lines of steamships, based upon the latest available data,[b] are presented herewith:

[a] In re lighterage and storage regulations at New York, N. Y., decided July 7, 1915, Interstate Commerce Commission Reports, vol. 35, p. 49.
[b] Exporters' Encyclopedia, 1915.

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| Lines. | Sailings. | Destination. | Piers. | Service. |
|---|---|---|---|---|
| African Steamship Co. | 1 monthly [a] | West Coast of Africa | Erie Basin or Atlantic Basin | Freight and passenger. |
| America-Levant Line | ....do | Barcelona (Spain), Genoa and Naples (Italy), Alexandria (Egypt), Smyrna (Turkey), Piræus (Greece). | 2 Bush Terminal | Freight. |
| American and African Steamship Line. | 2 monthly [b] | East Coast of Africa | ....do | Do. |
| Do | Every 12 days [b] | South Africa | ....do | Do. |
| American and Australian Steamship Line. | Every 10 days | Melbourne and Sydney (Australia) | 1 and 2 Bush Terminal | Freight and passenger. |
| Do | Every 20 days | Australia, Tasmania, New Zealand | ....do | Do. |
| American and Cuban Steamship Line. | 1 weekly | Havana (Cuba) | 7 Hudson River | Freight. |
| Do | Every 3 weeks | Other cities in Cuba | ....do | Do. |
| Do | 1 monthly | Tampico, Vera Cruz, and Progreso (Mexico) | ....do | Do. |
| American and Indian Steamship Line. | ....do | Aden (Arabia), Colombo (India) | 2 or 3 Bush Terminal | Do. |
| Do | 2 monthly | Bombay and Calcutta (India) | ....do | Do. |
| Do | Every 3 weeks | Port Said (Egypt), Bombay (India) | ....do | Do. |
| American and Manchurian Line | 2 monthly [c] | East Indies, Philippines, China, Japan | 2 Bush Terminal | Do. |
| Do | Every 20 days [c] | Aden (Arabia) | ....do | Do. |
| American and Oriental Line | 2 monthly [c] | East Indies, Philippines, China, Japan | 4 Bush Terminal | Do. |
| Do | Every 20 days [c] | Aden (Arabia) | ....do | Do. |
| American and Rio Plata Line | 2 monthly | Buenos Aires, Rosario, and La Plata (Argentina.) | American Docks, Tompkinsville, Staten Island. | Do. |
| Do | 1 or 2 monthly | Montevideo (Uruguay) | ....do | Do. |
| American-Asiatic Steamship Co | 2 monthly [c] | Straits Settlements, Philippines, China, Japan. | Bush Terminal | Do. |
| Do | Every 20 days [c] | Aden (Arabia) | ....do | Do. |
| American Exporters' Line | Every 2 weeks | Copenhagen (Denmark), Goteborg (Sweden). | 7 Bush Terminal | Do. |
| American-Hawaiian Steamship Co | Every 5 days | San Francisco, Cal., Honolulu (Hawaii) | 6 Bush Terminal | Do. |
| American Line | 1 weekly | Liverpool | 62 Hudson River | Freight and passenger. |
| Anchor Line | 1 monthly | Leghorn and Naples (Italy) | 29 Union Stores, Brooklyn | Do. |
| Do | 1 weekly | Glasgow (Scotland) | 64 Hudson River | Do. |
| Atlantic Fruit Co | ....do | Jamaica | 7 East River | Freight. |
| Do | Every 2 weeks | Frontera (Mexico) | ....do | Do. |
| Atlantic Transport Line | 1 weekly | London | 58 Hudson River or Atlantic Transport Pier (West Eighteenth Street). | Freight and passenger. |
| Austro-Americana Steamship Co | 3 or 4 monthly [d] | Trieste (Austria), Naples (Italy) | Bush Terminal | Do. |
| Do | 1 or 2 monthly [d] | Algiers | ....do | Do. |
| Do | 1 monthly [d] | Fiume (Hungary), Patras (Greece), Venice (Italy). | ....do | Do. |
| Bahamas Government Line | Every 18 days | Bahama Islands | 15 Brooklyn | Freight. |
| Barber Line | 3 monthly | La Plata, Buenos Aires, and Rosario (Argentina), Montevideo (Uruguay). | South Central Pier, Atlantic Basin | Do. |
| Do | 2 monthly [c] | East Indies, Philippines, China, Japan | 36 and 37 Atlantic Basin | Do. |
| Do | Every 20 days [c] | Aden (Arabia) | ....do | Do. |

[a] Joint service: African Steamship Co., British & African Steam Navigation Co. (Ltd.), and Elder Line (Ltd.).
[b] Joint service: American-African Steamship Line, Houston Line, Prince Line, South and East African Service, and Union-Clan Line.
[c] Joint service: American & Manchurian Line, American & Oriental Line, American-Asiatic Steamship Co., Barber Line, and Indra Line (Ltd.).
[d] Service suspended during war in Europe.

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| Lines. | Sailings. | Destination. | Piers. | Service. |
|---|---|---|---|---|
| Barber Line | 2 monthly | Bordeaux and Havre (France) | 36 and 37 Atlantic Basin | Freight. |
| Do | Irregular | Newport and Cardiff (Great Britain) | ....do | Do. |
| Booth Steamship Co. (Ltd.) | 2 monthly | Para (Brazil) | Pier 4, Martin's Stores, Brooklyn | Freight and passenger. |
| Do | 1 monthly | Manaos, Maranhao, and Ceara (Brazil) | ....do | Do. |
| Do | Every 2 months | Parnahyba and Natal (Brazil) | ....do | Do. |
| Bristol City Line | 4 to 6 monthly | Bristol and Swansea (Great Britain) | 69 Hudson River, West Twenty-ninth Street. | Freight. |
| British and African Steam Navigation Co. (Ltd.). | 1 monthly[a] | West Coast of Africa | Erie Basin or Atlantic Basin | Freight and passenger. |
| Bull-Insular Line (Inc.) | 1 weekly | San Juan, Mayaguez, and Ponce (Porto Rico). | 27 Robinson Stores, Brooklyn | Freight. |
| Do | 2 to 4 monthly | Arecibo, Arroyo, and Aguadilla (Porto Rico). | ....do | Do. |
| Clyde Steamship Co | Every 10 days | Puerto Plata, Samana, etc. (Santo Domingo) | 34 Atlantic Basin | Freight and passenger. |
| Do | Every 20 days | Monte Cristi, Azua (Santo Domingo) | ....do | Do. |
| Do | Every 2 weeks | Turks Islands (Bahama Islands) | ....do | Do. |
| Commonwealth and Dominion Line | Every 20 days | Australia | 10 Brooklyn | Freight. |
| Compagnie Generale Transatlantique | 1 weekly | Havre (France) | 57 Hudson River, West Fifteenth Street | Freight and passenger. |
| Do | 1 monthly | Bordeaux and Dunkirk (France) | 84 Hudson River, West Forty-fourth Street | Do. |
| Compania Transatlantica | 1 monthly | Havana (Cuba), Vera Cruz, and Puerta Mexico (Mexico). | 8 East River | Do. |
| Do | ....do | Cadiz (Spain) | ....do | Do. |
| Do | ....do | Bilboa, Barcelona, and Seville (Spain) | Erie basin | Freight. |
| Do | Irregular | Cadiz, Santander, and Huelva (Spain) | ....do | Do. |
| Cunard Line | 1 weekly | Liverpool | 53, 54, and 56 Hudson River | Freight and passenger. |
| Do | 3 or 4 monthly[b] | Trieste and Fiume (Austria-Hungary) | ....do | Do. |
| Do | 2 monthly | Genoa and Naples (Italy), Patras (Greece) | ....do | Do. |
| Dutch East India Service | 1 monthly | East Indies | Bush Terminal | Freight. |
| Elder Line (Ltd.) | ....do.[a] | West Coast of Africa | Erie Basin or Atlantic Basin | Freight and passenger. |
| Fabre Line | 4 monthly | Marseille (France) | Thirty-first Street, Brooklyn | Do. |
| Do | 4 or 5 monthly | Naples (Italy) | ....do | Do. |
| Do | 4 monthly | Azores and Lisbon (Portugal) | ....do | Do. |
| Funch, Edye & Co.'s Line | 1 monthly | Brazil | Bush Terminal | Do. |
| Gans Steamship Line | ....do.[b] | Rotterdam (Holland) | Erie Basin | Freight. |
| Do | ....do | Portugal, Spain | ....do | Do. |
| Do | Irregular | Italy, Spain | ....do | Do. |
| Do | ....do | Leith (Scotland) | ....do | Do. |
| Hamburg-American Line | 5 to 8 monthly[b] | Hamburg (Germany) | First Street, Hoboken, N. J | Freight and passenger. |
| Do | 2 monthly[b] | Naples and Genoa (Italy) | Thirty-third Street, Brooklyn | Do. |
| Do | ....do.[b] | Genoa (Italy) | Hoboken, N. J | Do. |
| Hamburg-American Line (Atlas Service) | 1 weekly[b] | Bahama Islands, Haiti, Jamaica, Colombia | 65 Hudson River | Do. |
| Do | ....do.[b] | Bahama Islands, Costa Rica, Cuba, Panama | ....do | Do. |
| Do | Every 2 weeks[b] | Jamaica, Colombia | ....do | Do. |
| Do | ....do.[b] | Haiti | ....do | Do. |
| Do | Alternate Fridays and Saturdays during the season.[b] | Port Antonio (Jamaica) | ....do | Do. |
| Holland-America Line | 1 weekly | Rotterdam (Holland) | Fifth Street, Hoboken, N. J | Do. |

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|---|---|---|---|---|
| Houston Line | 2 monthly | East Coast of Africa | 38 Atlantic Basin | Freight. |
| Do | Every 12 days [c] | South Africa | ....do | Do. |
| Do | 2 monthly | Brazil, Uruguay | ....do | Do. |
| Indra Line (Ltd.) | ....do.[d] | East Indies, Philippines, China, Japan | 3 Bush Terminal | Do. |
| Do | Every 20 days [d] | Arabia | ....do | Do. |
| Iquitos Steamship Co. (Ltd.) | Every 2 months | Peru | 4 Martin's Stores, Brooklyn | Freight and passenger. |
| Italia Line | 1 weekly [e] | Naples and Genoa (Italy) | 74 Hudson River | Do. |
| Lamport & Holt Line | 3 monthly | Buenos Aires (Argentina), Brazil | 8 Brooklyn | Do. |
| Do | 1 monthly | La Plata (Argentina) | ....do | Do. |
| Do | 3 monthly | Manchester | ....do | Do. |
| Do | 2 monthly | Uruguay | ....do | Do. |
| La Veloce Line | 1 weekly [e] | Naples and Genoa (Italy) | 74 Hudson River | Do. |
| Lloyd Brazileiro | 3 to 5 monthly | Rio de Janeiro and Santos (Brazil) | 5 Bush Terminal | Do. |
| Do | 3 monthly | Pernambuco (Brazil) | ....do | Do. |
| Do | 1 monthly | Other cities in Brazil | ....do | Do. |
| Lloyd Italiano | Every 2 weeks | Italy | 74 Hudson River | Do. |
| Lloyd Sabaudo | ....do | ....do | B, Grand Street, Jersey City, N. J | Do. |
| Mallory Steamship Co | 2 weekly | Galveston, Tex | 45 Hudson River | Do. |
| Merchants' Line | Every 2 weeks | Chile, Ecuador, Peru | 33 Atlantic Basin | Freight. |
| Do | 1 monthly | Brazil | ....do | Do. |
| Munson Steamship Line | Every 2 weeks | Cuba | 9 East River; Old Slip, New York | Freight and passenger. |
| Do | Every 4 weeks | Puerto Padre (Cuba) | ....do | Do. |
| National Steam Navigation Co | 1 weekly | Greece | B, Erie Basin | Do. |
| Navigazione Generale Italiana | ....do.[e] | Naples and Genoa (Italy) | 74 Hudson River | Do. |
| New York & Cuba Mail Steamship Co | Every 2 weeks | Bahama Islands | 13 and 14 East River | Do. |
| Do | 2 weekly | Havana (Cuba) | 13 and 14 East River and 16, 17, and 18, Brooklyn. | Do. |
| Do | Every 10 days | Other cities in Cuba | ....do | Do. |
| Do | 1 weekly | Progreso, Vera Cruz, and Puerto Mexico (Mexico). | ....do | Do. |
| Do | ....do | Tampico (Mexico) | ....do | Do. |
| New York & Porto Rico Steamship Co | ....do | San Juan, Ponce, and Mayaguez (Porto Rico) | 35 Atlantic Basin | Do. |
| Do | Every 2 weeks | Arecibo, Aguadilla, and Arroyo (Porto Rico) | ....do | Do. |
| New York & South America Line | Occasionally | Argentina | 36 Atlantic Basin | Freight. |
| Do | "Regular direct service." | Chile, Peru | ....do | Do. |
| North German Lloyd Steamship Co | 4 to 9 monthly [b] | Bremen | Third and Fourth Streets, Hoboken, N. J | Freight and passenger. |
| Do | 2 to 4 monthly [b] | Genoa and Naples (Italy), Gibraltar | ....do | Do. |
| Northern Steamship Co. (Ltd.) | 1 monthly | Vladivostok (Siberia) via Panama Canal | Not stated | Freight. |
| Norton Line | 1 or 2 monthly | Buenos Aires, La Plata, and Rosario (Argentina). | 2 Bush Terminal | Do. |
| Do | 2 monthly | Montevideo (Uruguay) | ....do | Do. |
| Norwegian-America Line | Every 3 weeks | Norway | 4 Bush Terminal | Do. |
| Panama Railroad Steamship Line | 6 monthly | Colon and Balboa (Panama) | 67 Hudson River | Freight and passenger |
| Phoenix Line | Every 2 weeks [b] | Antwerp (Belgium) | 58 to 61 Hudson River | Freight. |
| Prince Line | 2 monthly [c] | East Coast of Africa | 4 Bush Terminal | Do. |
| Do | Every 12 days [c] | South Africa | ....do | Do. |

[a] Joint service: African Steamship Co., British & African Steam Navigation Co., (Ltd.), and Elder Line (Ltd.).
[b] Service suspended during war in Europe.
[c] Joint service: American-African Steamship Line, Houston Line, Prince Line, South and East African Service, and Union-Clan Line.
[d] Joint service: American & Manchurian Line, American & Oriental Line, American-Asiatic Steamship Co., Barber Line, and Indra Line (Ltd.).
[e] Joint service: Italia Line, La Veloce Line, and Navigazione Generale Italiana.



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| Lines. | Sailings. | Destination. | Piers. | Service. |
|---|---|---|---|---|
| Prince Line | Twice monthly | Argentina, Brazil, Uruguay | 4 Bush Terminal | Freight and passenger. |
| Quebec Steamship Co | Every 7 to 10 days | Bermuda | 47 Hudson River | Do. |
| Do | Every 10 to 14 days | British Guiana, Barbados, Leeward and Windward Islands. | do | Do. |
| Red Cross Line | 1 weekly | Halifax (Nova Scotia), St. Johns (Newfoundland). | 32 Brooklyn | Do. |
| Red "D" Line | do | Curacao, Venezuela | 11 Brooklyn | Do. |
| Do | Every 2 weeks | Porto Rico, Venezuela | do | Do. |
| Red Star Line | 1 weekly[a] | Antwerp (Belgium) | 61 Hudson River | Do. |
| Royal Dutch West India Mail Line | Every 2 weeks | Haiti, Curacao, Venezuela, Barbados, British Guiana, Dutch Guiana. | 3 Bush Terminal | Do. |
| Royal Mail Steam Packet Co | 1 or 2 weekly | Bermuda | 42 Hudson River | Do. |
| Do | 1 weekly | Cuba | do | Do. |
| Do | Every 2 weeks | Jamaica, Panama, Colombia | do | Do. |
| Do | do | Leeward and Windward Islands | do | Passenger. |
| Russian-East Asiatic Steamship Co | Every 10 days[a] | Rotterdam (Holland), Libau (Russia) | Bush Terminal | Freight and passenger. |
| Do | Every 2 weeks[a] | Rotterdam (Holland) | Thirty-first Street, Brooklyn | Do. |
| Scandella Line | Every 2 months | Venezuela | No regular pier | Freight. |
| Scandinavian-American Line | 2 or 3 monthly | Copenhagen (Denmark) | Seventeenth Street, Hoboken, N. J | Freight and passenger. |
| Do | 3 monthly | Christiania (Norway) | do | Do. |
| Sicula-American Steamship Co | Every 3 weeks | Naples, Messina, and Palermo (Italy) | 22 Atlantic Basin | Do. |
| Societa Anonima Transporti Mestre | Every 2 weeks | Genoa and Venice (Italy) | 7 Bush Terminal | Freight. |
| South and East African Service | 2 monthly[b] | East Coast of Africa | 3 Bush Terminal | Do. |
| Do | Every 12 days[b] | South Africa | do | Do. |
| Southern Pacific Co. (Morgan Line) | 3 weekly | Galveston, Tex | 48 to 52 Hudson River | Freight and passenger. |
| Do | 2 weekly | New Orleans, La | do | Do. |
| Swedish-America-Mexico Line | 3 monthly | Goteborg (Sweden) | Not stated | Do. |
| Trinidad Line | Every 10 to 14 days | Trinidad | 24 Robinson Stores, Brooklyn | Do. |
| Do | Every 2 weeks | Grenada, Trinidad, British Guiana, Dutch Guiana. | do | Do. |
| Union-Clan Line | 2 monthly[b] | East Coast of Africa | 36 Atlantic Basin | Freight. |
| Do | Every 12 days[b] | South Africa | do | Do. |
| United Fruit Co | 2 weekly | Panama, Jamaica | 15 and 16 East Rive | Freight and passenger. |
| Do | 1 weekly (Wednesday) | Colombia | do | Do. |
| Do | 1 weekly (Thursday) | Costa Rica | do | Do. |
| Do | 1 weekly (Saturday) | Havana (Cuba), and various places in Jamaica. | do | Do. |
| Do | 1 weekly | Santiago de Cuba (Cuba) | 16 or 33 East River | Do. |
| Do | Every 2 weeks (Thursday). | Guatemala, Honduras | 15 and 16 East River | Do. |
| Do | Every 2 weeks (Friday) | British Honduras | 33 East River | Do. |
| Do | Every 2 weeks (Saturday). | Panama | 15 and 16 East River | Do. |
| United States & Australasia Steamship Co. | 1 monthly | Australia | 37 Atlantic Basin | Freight. |
| United States & Brazil Steamship Line | do | Brazil | 7 Hudson River | Do. |

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| | | | | |
|---|---|---|---|---|
| West Coast Line | ....do | Chile | Not stated | Do. |
| Do | 2 monthly | Peru | ....do | Do. |
| White Star Line | 1 weekly | Liverpool | 59 and 60 Hudson River | Freight and passenger. |
| Do | 2 monthly | Manchester | ....do | Do. |
| Do | 1 or 2 monthly | Naples and Genoa (Italy), Gibraltar | ....do | Do. |
| Wilson Line | 1 weekly | Hull (England) | Seventh Street, Hoboken, N. J. | Do. |
| Do | Every 10 days | ....do | ....do | Freight. |

a Service suspended during war in Europe.
b Joint service: American-African Steamship Line, Houston Line, Prince Line, South and East African Service, and Union-Clan Line.

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The following is a list of the principal lines of steamboats plying on the Hudson River and Long Island Sound:

| Lines. | Sailings. | Ports of destination. |
|---|---|---|
| Hudson River: | | |
| Albany Day Line | 1 daily | Albany. |
| Do | 2 daily | Poughkeepsie. |
| Catskill Evening Lines | 1 daily except Sunday | Catskill, Hudson, and other points. |
| Central-Hudson Steamboat Co. | 2 daily except Sunday | Poughkeepsie and Kingston. |
| Hudson Navigation Co. | 4 daily | Albany and Troy. |
| Manhattan Navigation Co. | 1 daily | Albany. |
| Long Island Sound: | | |
| Central Vermont Ry. Line | 1 daily except Sunday | New London. |
| Colonial Navigation Co. | 1 daily | Providence. |
| Eastern Steamship Corporation— | | |
| Metropolitan Steamship Line | do | Boston. |
| Maine Steamship Line | 4 weekly, June to September; 3 weekly, September to June | Portland, Me. |
| Hartford & New York Transportation Co. | 1 daily | Providence. |
| Do | 1 daily except Sunday | Hartford. |
| Montauk Steamboat Co. (Ltd.) | 1 daily | North shore of Long Island. |
| New England Steamship Co.— | | |
| Bridgeport Line | 1 daily except Sunday | Bridgeport. |
| Fall River Line | 1 daily | Fall River. |
| New Bedford Line | 1 daily except Sunday | New Bedford. |
| New Haven Line | do | New Haven. |
| New London Line | do | New London. |
| Providence Line | do | Providence. |
| Norwich & New York Propeller Co. | 3 weekly | New London and Norwich. |
| Starin Line | 1 daily | New Haven. |

In addition, there are several freight lines that handle a large traffic between New York and Newark and other near-by points in New Jersey.

**Commerce of the port.**—The Chief of Engineers, United States Army, reports that "no comprehensive record of the commerce of the port of New York is kept, and its magnitude and diversity preclude the possibility of preparing such for this report."[a]

Complete and accurate statistics of the foreign trade of the port are available in the report of the Bureau of Foreign and Domestic Commerce, but data as to the volume of the coastwise and the intraharbor trade are wholly or partially incomplete. That the coastwise movement from and to the port of New York is very large is indicated by the large number of the coastwise lines that call regularly at the port and the frequency of their sailings.

New York City is the most important industrial center in the United States. The value of its manufactures exceeds that of any State in the Union except Pennsylvania, which means that large quantities of raw materials are shipped in and large quantities of finished product are shipped out. New York City and its metropolitan district had at the census of 1910 a population of 6,474,568, which is distributed in numerous localities, many of which can be reached by water. This means a large intraharbor trade. Because of the fact that regular lines of vessels and tramp vessels from all parts of the world come to the port of New York, a large transshipping trade has grown up.

An example of the complicated nature of the shipping of the port is given by the freight steamers of the Central Vermont Railway, which carry large quantities of hides, skins, wool, and other South American

[a] Report, Chief of Engineers, U. S. Army, 1914, p. 1736.

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products from New York to New London to be transshipped over its road and that of the Grand Trunk Railway to eastern Canada. Frequently these steamers return to New York with cargoes of meat products, grain, etc., from points in the Middle West that are reached by the Grand Trunk system.

The foreign trade of the port of New York in the fiscal year ending June 30, 1914, was valued at $1,904,926,864. Imports amounted to $1,040,380,526 and exports to $864,546,338.

According to value the principal commodities imported during the year were as follows: India rubber, $70,088,405; coffee, $69,588,004; sugar and molasses, $64,827,689; hides and skins, $68,718,845; tin, $35,572,994.

The following is a list of the principal commodities exported during the year: Iron and steel, $148,431,694 (including machinery and parts of, $77,387,841, and all other manufactures of iron and steel, $71,043,853); copper (pigs, ingots, bars, etc.), $90,548,831; meat products, $79,079,546; mineral oils, $83,384,938; breadstuffs, $47,661,286.

Separate statistics of the coastwise trade and intraharbor traffic are, as stated above, not available. These data are, however, included in general statistics compiled by the United States Army Engineers, which are presented in the following table and show the total volume of commerce passing through the several sections of the port. Doubtless many duplications occur in these compilations because of the great volume of freight interchanged between various sections of the port. It would be inadvisable, therefore, to make a summation of the traffic on the several waterways and regard that as representative of the total commerce of the port. These data are of value only so far as they give a general statistical view of the traffic in the several sections of the port.

| Waterways. | Short tons. | | Value. | |
|---|---|---|---|---|
| | 1913 | 1914 | 1913 | 1914 |
| New York section: | | | | |
| Hudson River | 64,517,302 | 58,644,614 | $2,958,075,917 | $4,559,185,809 |
| East River | [a] 45,331,216 | 46,553,605 | (b) | 1,537,239,286 |
| Harlem River | 18,313,336 | 11,577,922 | 704,984,490 | 582,383,737 |
| Gowanus Bay | 6,651,469 | 8,159,186 | (b) | (b) |
| Newtown Creek | 5,141,516 | 4,445,556 | 226,962,025 | 147,739,825 |
| Gowanus Canal | 3,000,000 | (b) | (b) | (b) |
| Wallabout Channel | 1,048,340 | 990,618 | 9,209,538 | 13,021,165 |
| Flushing Bay | 917,561 | 853,714 | 969,011 | 968,461 |
| Jamaica Bay | 816,132 | 768,550 | 5,345,879 | 5,171,668 |
| Bronx River | 658,473 | 841,586 | 2,443,407 | 1,947,786 |
| Westchester Creek | 571,166 | 589,322 | 1,531,161 | 1,036,984 |
| East Chester Creek | 194,956 | 135,065 | 1,158,279 | 857,827 |
| New Jersey section: | | | | |
| Arthur Kill | [c] 30,525,094 | 32,140,264 | [c] 515,437,656 | 477,993,429 |
| Raritan Bay | 6,612,484 | 6,120,085 | 40,138,320 | 33,277,650 |
| Newark Bay | [d] 2,807,387 | 4,260,541 | [d] 64,439,074 | 81,489,426 |
| Raritan River | 1,243,923 | 1,034,853 | 73,175,177 | 63,133,228 |
| Elizabeth River | 38,716 | 29,103 | 859,814 | 530,724 |

[a] Not including through traffic.
[b] Not reported.
[c] Data are for 1912. Includes portions of the commerce of the Passaic and other rivers that passed through the Arthur Kill.
[d] Includes commerce of the Hackensack and Passaic Rivers that passed through Newark Bay.

*Commerce of New York sections of the port.*—The general character of the commerce of the Hudson River within the limits of the port is

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indicated in the following extract from the Annual Report of the Chief of Engineers of the United States Army, for 1914 (p. 234):

The tonnage of the commerce handled in the Hudson River Channel (North River) in 1912, as obtained from the best available information, amounted to about 72,000,000 tons, of which 41,000,000 tons were handled from piers in Manhattan Borough, New York City, and 31,000,000 from piers in New Jersey at and above Jersey City to Fort Lee.

As the result of a thorough canvass made in 1914, it appears that the total commerce in 1913, in the section of the Hudson River included in the project for improvement, amounted to 64,517,302 tons, valued at $2,958,075,917.

Owing to the great variance in the character of the traffic in the North River, and the exceedingly large number of craft of all classes arriving at and departing from the various piers and passing through the channel to points beyond, it is impracticable to secure reliable information on this subject.

A considerable part of the tonnage of the Hudson River is coal. A number of railroads have important coal terminals on the New Jersey shore, to which coal is brought for transshipment to Boston and other New England points, as well as to localities within the limits of the port of New York. The magnitude of the coal traffic on the Hudson is indicated in part by statistics compiled by the Boston Chamber of Commerce, which show the quantities in short tons of anthracite received in Boston by vessel from the following cities on the New Jersey shore of New York Harbor: Guttenberg, 213,211; Port Johnson, 189,567; New York, 162,183; Perth Amboy, 158,800; Undercliffe, 131,342; Edgewater, 120,710; Hoboken, 118,707; South Amboy, 45,503; Elizabethport, 34,137; and Cornwall, 30,010.

In regard to the traffic of the East River, the following statement is of interest:[a]

The traffic in East River is very great, and it is intimately connected with that of New York Harbor proper. The aggregate tonnage in the East River section of Greater New York was estimated in 1911 at 45,331,216 short tons. This does not include through traffic. Data secured from reliable sources in 1909 show that the number of trips through Hell Gate Channel by steamers and tugs of established transportation lines averages about 450 daily, and of ferryboats using and crossing the channel about 400 daily. This does not include barges, lighters, and car floats in tow, or privately-owned commercial vessels or yachts. The size of the boats of the transportation lines varies from 50 to 456 feet in length, 12 to 96 feet beam, and 6 to 20 feet draft. Barges and lighters in tow are quite numerous, are of varying dimensions up to 23 feet draft, and are usually made up into tows of three barges each. The car floats are 327 feet long, 40 feet beam, and about 10½ feet draft, and are towed one on each side of a power boat, thus making up a tow of approximately 105 feet wide and 327 feet long. It is reported that about 100 of these car-float tows pass through Hell Gate during each 24 hours.

The commerce of the Harlem River in the calendar year 1913 included a large variety of commodities, the most important being those shown in the following tabular statement:[b]

| Commodities. | Short tons. | | Value. | |
|---|---|---|---|---|
| | 1913 | 1914 | 1913 | 1914 |
| General merchandise | 6,048,394 | 5,341,774 | $601,829,522 | $532,841,956 |
| Lumber, etc | 3,465,517 | 145,129 | 46,206,900 | 1,935,060 |
| Coal and other fuel | 5,922,835 | 3,965,749 | 24,339,448 | 15,837,516 |
| Grain and flour | 497,640 | 436,060 | 19,877,191 | 26,135,980 |
| Manufactured iron and steel | 80,229 | 20,325 | 2,737,880 | 497,313 |
| All other | 2,298,721 | 1,668,885 | 9,993,549 | 5,135,912 |
| Total | 18,313,336 | 11,577,922 | 704,984,490 | 582,383,737 |

[a] Report, Chief of Engineers, U. S. Army, 1914, p. 199. [b] Idem, 1914, p. 1760; idem, 1915, p. 2123.

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Statistics of the commerce of Gowanus Bay, which includes the traffic handled over the important terminals on the South Brooklyn water front, are given only in totals. It is reported that 6,651,469 short tons of freight were handled in this section in the calendar year 1913 and 8,159,186 short tons in 1914, the freight being classified as follows:[a]

| Class of trade. | 1913 | 1914 |
|---|---|---|
| Foreign: | *Short tons.* | *Short tons.* |
| Receipts | 1,847,906 | 2,601,753 |
| Shipments | 3,170,548 | 3,930,288 |
| Total | 5,018,454 | 6,532,041 |
| Domestic: | | |
| Receipts | 1,220,538 | 1,451,764 |
| Shipments | 412,477 | 175,381 |
| Total | 1,633,015 | 1,627,145 |
| Grand total | 6,651,469 | 8,159,186 |

Arrivals and departures of foreign vessels in this section of the harbor numbered 1,044 in the calendar year 1913, the maximum draft reported being 33 feet.[b]

In addition to the above traffic, it is stated that 25,663 barges and other light-draft boats passed through and under the Hamilton Avenue drawbridge from Gowanus Bay into the Gowanus Canal in 1913. These boats carried lumber, coal, building materials, sand, etc., the total tonnage being estimated at more than 3,000,000 short tons.

The development of the commerce on Newtown Creek has been rapid, chiefly as a result of the establishment in recent years of large industrial plants in that section of Long Island. The statistics compiled by the United States Army Engineers, which are reported as incomplete, indicate that 5,141,516 short tons of freight were carried on this waterway in the calendar year 1913, the amount being nearly twice as much as the total carried in 1903.

The following tabular statement contains a list of the most important commodities in the traffic on Newtown Creek in 1913 and 1914:[c]

| Commodities. | Short tons. | | Value. | |
|---|---|---|---|---|
| | 1913 | 1914 | 1913 | 1914 |
| Copper ore and products | 413,837 | 390,221 | $180,275,507 | $106,542,500 |
| Petroleum and products | 868,464 | 893,235 | 15,744,585 | 13,648,047 |
| General merchandise | 132,603 | 248,157 | 8,734,301 | 7,513,933 |
| Lumber, railroad ties, and piles | 443,028 | 206,971 | 6,940,389 | 4,537,132 |
| Coal and other fuel, etc | 1,373,053 | 1,156,683 | 4,337,379 | 4,249,087 |
| Alcohol and products | 10,449 | 8,120 | 2,391,712 | 3,889,400 |
| Cement, lime, etc | 306,520 | 122,217 | 1,855,512 | 891,873 |
| All other | 1,593,562 | 1,419,952 | 6,682,640 | 6,467,853 |
| Total | 5,141,516 | 4,445,556 | 226,962,025 | 147,739,825 |

[a] Report, Chief of Engineers, U. S. Army, 1914, p. 1739; idem, 1915, p. 2152.
[b] Idem, 1914, p. 1739.
[c] Idem, 1914, p. 1750; idem, 1915, p. 2155.

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The chief commodities in the commerce of Wallabout Channel in 1913 and 1914 are shown in the following statement: [a]

| Commodities. | Short tons. | | Value. | |
|---|---|---|---|---|
| | 1913 | 1914 | 1913 | 1914 |
| General merchandise | 146,992 | 114,014 | $5,354,088 | $5,711,920 |
| Coal and other fuel | 769,084 | 655,537 | 2,213,615 | 2,111,041 |
| Petroleum and products | 107,393 | 60,893 | 1,243,201 | 684,670 |
| All other | 24,871 | 160,174 | 398,634 | 4,513,534 |
| Total | 1,048,340 | 990,618 | 9,209,538 | 13,021,165 |

The bulk of the commerce of Jamaica Bay consists of garbage, refuse, ashes, cinders, etc., carried to the municipal disposal plants on Barren Island, and of building material for harbor development works now in progress. The most important item from the standpoint of value was that of lead, tin, and products, the value of which was $3,237,993, or more than three-fifths of the total value ($5,345,879) for this section of the port.

The traffic on the Bronx River consists almost entirely of coal, cement, lime, brick, manufactured iron and steel, and gravel and sand, and was carried largely by canal boats, barges, lighters, etc.

The principal commodities in the traffic on Westchester Creek in 1913 were coal, cement, lime, and other building materials.

The traffic on East Chester Creek is small. The principal commodities were oil, petroleum, etc., and coal.[b]

*Commerce of New Jersey sections of the port.*—The commerce handled in the New Jersey sections of the port of New York constitutes a large part of the total commerce of the port. The most important of these sections is the Arthur Kill, on which large copper and lead smelting works, important chemical and fertilizer plants, and other manufacturing establishments are located. The commodities constituting the commerce of Arthur Kill in the calendar years 1913 and 1914 are shown in the following tabular statement.

| Commodities. | Short tons. | | Value. | |
|---|---|---|---|---|
| | 1913 | 1914 | 1913 | 1914 |
| Oils and oil products | 5,680,160 | 5,551,623 | $110,480,530 | $117,885,067 |
| Ores and metals | 571,450 | 486,889 | 106,534,679 | 95,587,193 |
| Coal and general merchandise | 16,467,767 | 19,588,176 | 62,106,896 | 92,396,697 |
| General merchandise | 322,829 | 30,574 | 16,141,450 | 6,962,529 |
| Machinery | 90,033 | 267,037 | 9,843,519 | 7,343,737 |
| Fertilizers | 313,256 | 392,711 | 6,150,990 | 2,523,493 |
| Plaster and products | 536,196 | 199,163 | 5,361,960 | 4,900,145 |
| Chemicals | 158,137 | 6,273 | 4,651,114 | 353,321 |
| Iron and steel | 58,858 | 250,336 | 3,096,755 | 2,307,005 |
| Crude and refined asphalt | 179,611 | 3,179,362 | 1,716,376 | 53,114,559 |
| All other | 6,146,797 | 29,952,144 | 189,352,987 | 393,373,746 |
| Through traffic from— | | | | |
| Passaic River | [d] 2,795,857 | 1,065,135 | [d] 127,219,684 | 20,372,357 |
| Other rivers | [d] 3,000,000 | 1,122,985 | [d] 60,000,000 | 64,247,326 |
| Total | 30,525,094 | 32,140,264 | 515,437,656 | 477,993,429 |

[a] Report, Chief of Engineers, U. S. Army, 1914, p. 1752; idem, 1915, p. 2154.
[b] Idem, 1914, pp. 1688-1692.
[c] Idem, 1914, p. 1776; idem, 1915, p. 2177.
[d] Estimated.

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The commerce of Raritan Bay is large. Exclusive of the commerce of tributary streams and of that part of the commerce of Arthur Kill that passed through the bay, the total volume of commerce in the calendar year 1913 was 6,612,484 short tons, valued at $40,138,320. The foreign trade amounted to 583,989 short tons, valued at $18,273,839, and the domestic trade to 6,028,495 short tons, valued at $21,864,481.

The foreign commerce of Raritan Bay in 1913 and 1914, as reported by the Collector of Customs at Perth Amboy, N. J., consisted of the following principal commodities:[a]

| Commodities. | Short tons. | | Value. | |
|---|---|---|---|---|
| | 1913 | 1914 | 1913 | 1914 |
| Imports: | | | | |
| Lead— | | | | |
| Bullion | 33,232 | 8,348 | $6,019,905 | $1,530,985 |
| Ore | 45,412 | 3,596 | 1,717,633 | 136,648 |
| Copper— | | | | |
| Bullion | 5,572 | 1,903 | 1,704,433 | 481,356 |
| Ore | 23,796 | 43,322 | 1,316,301 | 2,260,463 |
| Matte | 8,746 | 3,442 | 1,080,442 | 248,371 |
| Crude asphalt | 138,736 | 61,710 | 559,301 | 268,828 |
| Petroleum | 101,750 | 15,238 | 521,275 | 87,028 |
| Pyrites, iron | 58,815 | 67,480 | 411,342 | 539,840 |
| Nitrate of soda | 8,828 | 4,916 | 369,268 | 53,353 |
| All other | 13,633 | 20,163 | 417,003 | 4,352,103 |
| Total | 438,520 | 230,118 | 14,116,903 | 9,958,978 |
| Exports: | | | | |
| Refined lead | 35,705 | 26,303 | 3,213,463 | 1,807,887 |
| Fertilizer | 26,078 | 30,589 | 390,214 | 361,200 |
| Coal | 78,506 | 73,436 | 357,857 | 454,113 |
| All other | 5,180 | 1,670 | 195,402 | 68,720 |
| Total | 145,469 | 131,998 | 4,156,936 | 2,691,920 |

The commerce that passes through Newark Bay to and from the Passaic and Hackensack Rivers and to and from points on the bay proper consists largely of ores and metals and general merchandise. The following tabular statement shows the quantity and value of the principal commodities in this commerce in the calendar years 1913 and 1914:[b]

| Commodities. | Short tons. | | Value. | |
|---|---|---|---|---|
| | 1913 | 1914 | 1913 | 1914 |
| Ores and metals | 112,289 | 87,846 | $26,103,333 | $36,010,000 |
| General merchandise | 213,025 | 225,052 | 20,130,405 | 17,892,920 |
| Chemicals and colors | 42,192 | 22,970 | 3,865,393 | 2,350,259 |
| Lumber | 240,906 | 138,873 | 2,429,531 | 2,288,782 |
| Cement, plaster, etc | 126,354 | 77,090 | 1,255,205 | 410,698 |
| Ale and beer | 14,850 | 21,047 | 1,292,000 | 1,831,130 |
| Brick | 389,750 | 164,474 | 1,101,574 | 478,277 |
| Hackensack River traffic | 813,972 | 460,303 | 3,080,406 | 2,443,263 |
| All other | 854,049 | 3,062,886 | 5,181,227 | 17,784,097 |
| Total | 2,807,387 | 4,260,541 | 64,439,074 | 81,489,426 |

[a] Report, Chief of Engineers, U. S. Army, 1914, p. 1781; idem, 1915, p. 2181.
[b] Idem, 1914, p. 1768; idem, 1915, p. 2170.

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The most valuable commodities in the Raritan River traffic are ores and metals. In the calendar year 1913, the value of this class of commodities was $56,566,583, or more than three-fourths of the total ($73,175,177). Next in rank was general merchandise, which was valued at $6,400,200 in 1913.

The principal items in the commerce of the Elizabeth River in 1913 were rags and dry felt, valued at $400,915, and rosin, $160,000.

**Extent and ownership of water front.**—The following tabular statement shows the length of water front in the several sections of the port of New York in 1913: [a]

| Boroughs, etc. | Direct.[a] | | Developed.[b] | | Total.[c] | |
|---|---|---|---|---|---|---|
| | Linear feet. | Miles. | Linear feet. | Miles. | Linear feet. | Miles. |
| New York City: | | | | | | |
| Manhattan | 197,200 | 37.35 | 383,200 | 72.58 | 467,600 | 89 |
| Bronx | 341,600 | 64.70 | 99,500 | 18.84 | 406,050 | 77 |
| Brooklyn | 1,050,000 | 200.57 | 427,400 | 80.94 | 715,600 | 135 |
| Queens | 1,038,700 | 196.72 | 195,700 | 37.06 | 1,135,500 | 215 |
| Richmond | 294,400 | 55.75 | 95,000 | 17.99 | 329,600 | 62 |
| Jamaica Bay islands | (d) | (d) | (d) | (d) | 541,900 | 103 |
| Total | 2,930,900 | 555.09 | 1,200,800 | 227.41 | 3,596,250 | 681 |
| New Jersey | 1,018,700 | 192.94 | 704,600 | 133.45 | 1,266,000 | 240 |
| Aggregate | 3,949,600 | 748.03 | 1,905,400 | 360.86 | 4,862,250 | 921 |

[a] Measured along shore line.
[b] Measured around piers and the heads of slip.
[c] Measured around piers and shore line.
[d] Not reported.

The city of New York owns about 29 miles of direct water front in the borough of Manhattan, about 25 miles in the Bronx, about 14 miles in the borough of Brooklyn, about 58 miles in the borough of Queens, and 1.3 miles in the borough of Richmond. The city owns more than two-thirds of the total direct water front in the borough of Manhattan, over three-eighths in the Bronx, about one-fourteenth in Brooklyn borough, nearly three-tenths in Queens, and less than one-fiftieth in Richmond.

Large sections of water front are owned by dock and terminal companies, such as the New York Dock Co., the Bush Terminal Co., the Brooklyn Eastern District Terminal, the Jay Street Terminal, and the American Dock Co.

Railroad companies own comparatively little frontage in the boroughs of Manhattan, the Bronx, Queens, or Brooklyn. Railroad holdings on the Hudson River in the borough of Manhattan are small indeed, the New York Central Railroad being the principal owner with the tract between Fifty-ninth and Seventy-second Streets. A large part of the frontage in the boroughs of Manhattan and the Bronx is, however, occupied by railroad companies under long-term leases.

The principal frontage owned by the railroads is located on the New Jersey shore of the Hudson River, which is given over very largely to railroad-terminal yards, with car-transfer floats, grain elevators, and coal-handling plants.

[a] From statistics furnished by commissioner of docks, New York City, and published at pp. 41–42 of "Port of New York," Fourth Preliminary Report of the New Jersey Harbor Commission (February, 1914), on New Jersey's Relation to the Port of New York.

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Industrial companies occupy large tracts of water-front property, this being especially true in the case of the Kill Van Kull and such streams as Newtown Creek.

Concerns dealing in coal, brick, building supplies, lumber, and flour and feed are located chiefly on the smaller streams, such as the Harlem River, Bronx River, Westchester Creek, East Chester Creek, and Gowanus Canal.

**Terminals.**—The extensive water frontage of the port of New York is divided into many diverse sections. A detailed description of the various sections can be found in the report of the New Jersey Harbor Commission on "New Jersey's Relation to the Port of New York."[a] For the purposes of this report, however a brief description of the general features of the sections is more suitable. Such a description follows, treating first, the water front lying within the limits of the city of New York and, second, the New Jersey front. The description for New York City proceeds by boroughs in the following order: Manhattan, Bronx, Brooklyn, Queens, and Richmond.

### NEW YORK SECTION OF THE HARBOR.

*Hudson River (Borough of Manhattan).*—The Hudson River water front of Manhattan from the Battery to the beginning of Riverside Park at Seventy-second Street is the most sought after frontage in the harbor and exhibits the greatest congestion. It is here that the terminals of the great trans-Atlantic lines are located and it is here that the railroad companies have possession of a large amount of water front, which they use for the delivery and receipt of Manhattan freight. The city of New York, which owns most of this Hudson River water front, has erected many fine piers in this section and has leased them to private interests at profitable rentals to the city.

North of Carlisle Street are piers and the ferry terminals of the Central Railroad of New Jersey, the roof of which may be used for recreation purposes, and the ferry terminals of the West Shore Railroad (operating to Weehawken) and the Pennsylvania Railroad (operating to Jersey City). The pier at the foot of Dey Street is privately owned and is used by one of the railroad companies. The piers at the foot of Fulton and Vesey Streets are leased by the New England Navigation Co. for the steamboat lines running to Fall River and Portland.

At the foot of Barclay Street is the Lackawanna Railroad Ferry (operating to Hoboken); between this ferry and the Erie Ferry (operating to Pavonia) at the foot of Chambers Street are piers occupied by the New York Central Railroad, and at the foot of Murray and Warren Streets are piers used by the New England Navigation Co. for their steamboat lines to Providence and Boston.

The piers at the foot of Chambers and Duane Streets are occupied by the Erie Railroad; the pier north of Harrison Street, by the West Shore Railroad; and the pier at the foot of Franklin Street, by the Central Hudson Steamboat Co., operating Hudson River boats. The piers at the foot of North Moore and Beach Streets are occupied by the Old Dominion Steamship Co., and the three piers at Hubert, Laight, and Vestry Streets are occupied by the Pennsylvania Railroad Co.

At the foot of Desbrosses Street is the landing pier of the Albany Day Line and immediately north of this is the ferry terminal of the Pennsylvania Railroad operating to Jersey City. At the foot of Watts Street is a pier occupied by the New York Central Railroad and north of this is a pier used by the Hudson Navigation Co. At the foot of Canal Street is a small unshedded pier, the north side of which is used for open wharfage, while on the south side are dumping boards for the street-cleaning department and for a private company.

North of this is a pier used by the Lehigh Valley Railroad, then a pier just north of Spring Street used by the Ocean Steamship Co. for Savannah trade, and then come three piers occupied by the Clyde Line. The pier at the foot of West Houston Street is occupied by the Central Railroad of New Jersey and is used also for Hudson River boats. The pier at the foot of Clarkson Street is used by the New England Navigation Co., and the pier at the foot of Leroy Street is used by the Delaware, Lackawanna & Western Railroad Co. At the foot of Morton Street the Royal Mail Steam Packet Co.

[a] Fourth Preliminary Report, February, 1914.



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occupies a pier for their Bermuda, North Atlantic, and West Indies service. At the foot of Christopher Street is the terminal of the Delaware, Lackawanna & Western Railroad Co. Ferry operating to Hoboken, and immediately south of this is a pier, the upper deck of which is used for recreation purposes and the lower deck by one of the smaller lines operating up the Hudson.

North of the Lackawanna Ferry are three piers used by the Lehigh Valley and the Jersey Central Railroads and by the Hudson Navigation Co. At the foot of Perry Street is a small pier used by the Quebec Steamship Co. for their Bermuda and North Atlantic service. Between Perry and Gansevoort Streets are five piers which were formerly used by the great trans-Atlantic steamship lines, but these piers are now leased to the Southern Pacific Co. for their service to New Orleans, Galveston, and other Gulf ports. Between Gansevoort Street and Little West Twelfth Street there are three small open piers for public wharfage, and back of these, occupying valuable water front, is the new West Washington Market. This market is used principally for meats and poultry and receives nothing from the adjacent water front, except possibly coal.

Between Little West Twelfth Street and West Twenty-second Street are the so-called Chelsea Piers. These were completed by the city of New York in 1910 at a cost of about $24,000,000, and they constitute one of the finest steamship terminals in the world. There are seven whole piers and two half piers. The three southerly piers are leased to the Cunard Line; the next one to the north at the foot of Fifteenth Street is leased to the Compagnie Générale Transatlantique; and the four northerly piers are leased to the International Mercantile Marine and are used for the Atlantic Transport Line, the White Star Line, the Red Star Line, and the American Line.

North of Twenty-second Street are the ferry terminals of the Central Railroad of New Jersey, the Delaware, Lackawanna & Western Railroad, and the Erie Railroad with a half pier to the north, which was formerly used for open wharfage but has recently been leased to the American & Cuban Steamship Co. The Anchor Line has the pier just north of Twenty-fourth Street for its service to Glasgow, and north of this is a pier leased to the Hamburg-American Line for its Atlas service. North of this is a pier occupied by the Baltimore & Ohio Railroad, then a pier, just north of Twenty-seventh Street, occupied by the Erie Railroad and the Panama Railroad for its Panama service; next a pier occupied by the Delaware, Lackawanna & Western Railroad; and then a pier occupied by the Occident Dock Co. for service with British ports. At the foot of Thirtieth Street is a pier used for open wharfage and for dumping-board purposes. There are three transfer bridges between Twenty-fifth and Twenty-ninth Streets at the bulkheads, which are used by the Erie Railroad, the Lehigh Valley Railroad, and the Baltimore & Ohio Railroad for operating local delivery yards east of Thirteenth Avenue.

Between Thirtieth and Thirty-fourth Streets the water front is occupied by the New York Central Railroad and at Thirty-fourth Street is a pier leased to the Italian Royal Mail Steamship Co. for service to Genoa, Naples, and Mediterranean ports, while a pier at the foot of Thirty-first Street is leased to the Cunard Steamship Co.

Between Thirty-fourth and Forty-second Streets the water front is mostly used by railroads, the New York Central and Pennsylvania Railroads having local delivery yards connected with transfer bridges on the water front. At Forty-second Street is the ferry terminal of the West Shore Railroad operating to Weehawken, and at the foot of Forty-fourth Street is the pier used by the Compagnie Générale Transatlantique for its freight service.

Between Forty-fourth and Fiftieth Streets are a number of public piers, which are extensively used for coal and building materials. These piers are owned by the city and are located at the foot of each street, but the bulkheads are privately owned. The city of New York plans to use this section for terminals for the largest class of steamships by excavating inshore and is now engaged on the construction of the southerly piers, immediately north of Forty-fourth Street.

At Fiftieth Street is a recreation pier; between Fifty-second and Fifty-fourth Streets is a basin set aside by the legislature for canal traffic, and between Fiftieth and Fifty-seventh Streets the water front has until recently been used by the department of docks and ferries for the repair of ferryboats and floating equipment of the department. Substantial piers have been built at the foot of Fifty-sixth and Fifty-seventh Streets, and these have recently been leased to the following Italian steamship lines: La Veloce, Navigazione Italiana a Vapore, Navigazione Generale Italiana, Italia, and Lloyd Italiana. At Fifty-seventh Street are the yard, machine shops, repair shops, etc., of the New York City Dock Department. The pier at Fifty-eighth Street is leased to the Interborough Rapid Transit Co. and is used for the receipt of coal and the discharge of ashes.

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Between Sixty-third and Seventieth Streets the water front is in the possession of the New York Central Railroad, but the intervening street-end frontages are owned by the city. Here are located a large railroad yard, cattle pens, a grain elevator, and six piers, extending diagonally into the river.

Between West Seventy-second Street and West One hundred and twenty-ninth Street the water front is under the jurisdiction of the park department, except a small section in the vicinity of West Seventy-ninth Street and a small section in the vicinity of West Ninety-sixth Street, where the water front has been turned over to the dock department and used for commercial purposes for the receipt of coal and building materials and for dumping boards. Through acts of the legislature sections of the water front south of One hundred and thirtieth Street have been appropriated for the construction of a water gate and for a stadium for Columbia University.

At One hundred and twenty-ninth Street is a recreation pier, and between that point and One hundred and thirty-fifth Street there is a ferry terminal, operating to Fort Lee, and several piers owned by the city devoted to the use of building and market supplies.

North of the ferry at One hundred and thirtieth Street is a pier leased to the Manhattan Navigation Co. At the foot of One hundred and thirty-third, One hundred and thirty-fourth, and One hundred and thirty-fifth Streets are public piers that are used for open wharfage.

Between One hundred and thirty-fifth and One hundred and fifty-fifth Streets the water front is privately owned, except for some street ends, and is used for railroad purposes by the New York Central, for public bathhouses, and as a harbor for small pleasure craft. Between One hundred and fifty-fifth and One hundred and sixtieth Streets the city owns the water front and has built piers and bulkheads, which are much used for the receipt of building materials.

A pier at the foot of West One hundred and thirty-seventh Street is leased to the Hudson Navigation Co.

North of One hundred and sixtieth Street the river front is devoted to park purposes and there is no access to the water front that might be used for commercial purposes until Dyckman Street is reached at "Tubby Hook," a distance of more than 12,000 feet. North of Dyckman Street to the City Line there is no public access to the water front, and there probably will be no commercial development.

*East River (Borough of Manhattan).*—The Manhattan side of the East River opposite Randalls Island and Wards Island has been developed by the construction of piers and bulkheads, much of it being owned by the city.

Opposite Blackwells Island the water front is being developed for commercial purposes by the construction by the city of a permanent concrete-and-granite bulkhead wall, which is used extensively for the receipt of building materials, coal, etc., and for the removal of city wastes, which are loaded into barges.

South of Blackwells Island, down to East Thirty-fourth Street, are located terminals of some of the New Jersey railroads which are served by car floats, a number of slaughterhouses, one of the plants of the New York Edison Co., and a small amount of open wharfage.

At Thirty-fourth Street is the Manhattan terminal of the Long Island Railroad Ferry, and south of this are piers used as dumps and for open wharfage and for landing places for passenger steamboats.

The two city piers at the foot of Twenty-ninth and Twenty-eighth Streets were given to the Bellevue and allied hospitals to be used by them in connection with their work. At the foot of Twenty-fifth Street the department of charities uses a large shedded pier in connection with the distribution of supplies. The department of docks and ferries occupies the water front between Twenty-fourth and Twenty-fifth Streets for storage purposes and as a construction yard for making concrete blocks for bulkhead walls.

At the foot of East Twenty-fourth Street is the largest recreation pier in the city. At Twenty-third Street is a ferry terminal and below this are a number of unshedded piers devoted to open wharfage purposes. South of this the water front is occupied by the Bellevue and allied hospitals and by several marine repair plants which have floating dry docks.

There is a recreation pier at the foot of East Third Street, and between this and Corlears Hook Park are private piers and ferry terminals. Between Corlears Hook Park and Manhattan Bridge are several public piers, and the New York, New Haven & Hartford Railroad owns and has developed a freight terminal served by car floats.

The pier just south of Rutgers Street is a shedded public pier, which is much used for tramp ships. The use of this pier is restricted by law for deep-sea craft.

Under the Manhattan Bridge is the oyster market, which consists of small floating oyster houses.

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Between the Manhattan Bridge and the Brooklyn Bridge the water front is used mostly for terminals of the railroad companies and these are served by car floats.

Immediately south of the Brooklyn Bridge are two small piers in bad repair. South of these are piers used by the steamboats in the New England trade, and at Fulton Street is located the fish market, which occupies one pier and two adjoining bulkheads.

Below the fish market are piers used by the United Fruit Co., which brings large quantities of bananas by the New York & Cuba Mail Steamship Co., the Munson Line, and the Spanish Line; there are also piers devoted to railroad freight stations and to ships of the New England Navigation Co., which run from New York to points in New England. At the Battery are the terminal buildings of the Municipal Ferries. Just above the Battery on the East River is a small section of water front with piers, which is set aside by law as a terminal for canal-boat traffic. The pier at the foot of Gouverneur Street is used for public wharfage.

*Harlem River (Boroughs of Manhattan and Bronx).*—The shores of the Harlem River are owned almost entirely by private interests. There are several railroad terminals for local deliveries served by car floats from the New Jersey railroads. There are lumber and building material yards; a boat-building plant, used mostly for small pleasure craft; power houses for the Interborough Rapid Transit Co.; and various industries; but the shores are not intensively used for commercial purposes. A large portion of this frontage is cut off from the mainland by railroad tracks and by high ground, and the "speedway" takes up a considerable portion of the western shore.

With the opening of the New York State Barge Canal the importance of the Harlem River will increase, and certain improvements will probably be made to aid in navigation.

*Long Island Sound and East River (Borough of the Bronx).*—The north side of the River and Long Island Sound, to the east of Mott Haven, has had very little development, commercial or otherwise; but there are certain creeks and rivers running inland which are used to some extent for receiving building materials and which will no doubt be developed for this and other purposes.

The principal creeks referred to above are East Chester Creek, Pugsleys Creek, Westchester Creek, and the Bronx River.

A public pier built by the city, west of the Bronx River at the foot of Tiffany Street, is now much used in the receipt of building materials; and west of this are large lumber, railroad, and other private interests, as well as two public piers.

*Lower New York Bay (Borough of Brooklyn).*—The Brooklyn shore along Gravesend Bay is used for recreation purposes and as a harbor for pleasure craft. It has been proposed that Coney Island Creek, which extends easterly from Gravesend Bay, be widened and opened up as a canal leading from New York Harbor into Jamaica Bay.

There is no commercial development on the easterly side of Gravesend Bay and the Narrows.

*Upper New York Bay (Borough of Brooklyn).*—At the Narrows at the foot of Bay Ridge Avenue is a public dock, which is much used for the receipt of building materials and from which a private ferry has recently been opened up to connect Brooklyn with Staten Island. At Bay Ridge is to be the terminal of the New York Connecting Railroad.

The Brooklyn side of the Upper Bay possesses what is probably the finest example of terminal development on the Atlantic coast, if not anywhere in the world. This is the Bush Terminal.

Immediately north of the piers of the Bush Terminal is the ferry house of the municipal ferry, owned and operated by the city of New York.

North of this are the largest municipal piers in the port, one of which is leased to the Hamburg-American Line and the other to the Fabre Line. Adjoining these the city is now constructing three additional piers, ranging from 1,198 to 1,779 feet in length.

The building of a dry dock in this district is contemplated.

North of this is the Gowanus Canal, which extends a considerable distance into the heart of Brooklyn. This is of great value to the district in the receipt of coal and building materials.

North of the Gowanus Canal are the Brooklyn Basin and the Erie Basin, which at one time were greatly used for shipping, but have fallen into disuse except in a few instances. Their principal use now is for the storage of ships and pleasure craft.

In the Erie Basin, however, is located a very important shipyard, which has recently installed a floating dry dock of sufficient capacity to dock any but the very largest ships entering the harbor, and it is stated that the company proposes to increase the capacity of this dock.

Northerly from this is the enormously valuable property of the New York Dock Co., which includes practically the entire ownership of the water front from the Erie

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Basin to the Brooklyn Bridge, a distance of about 2¼ miles. There are about 36 piers along this water front in addition to considerable bulkhead development.

*East River (Borough of Brooklyn).*—North of the New York Dock Co.'s property and extending to the navy yard at Wallabout Basin, the property is largely owned by the Jay Street Terminal Co. The city of New York has built a public pier at the foot of Gold Street, which is the first public pier unleased north of the pier at Bay Ridge Avenue, a distance of about 6 miles. The Arbuckle Sugar Refinery is located on this frontage and uses it for receiving raw sugar, coal, etc., sending away the finished product.

The Jay Street Terminal is located on this property and consists of piers for car storage and transfer bridges to bring railroad cars from car floats to shore tracks, where local deliveries of freight are made, and where rails lead to buildings for warehousing and storage.

The New York Navy Yard site, located at Wallabout Basin, was purchased by the United States Government from the city of Brooklyn for the purposes of a navy yard.

North of Wallabout Basin, as far as the Williamsburg Bridge, the principal property was owned by the Union Ferry Co. and was formerly used for ferry purposes. Recently, however, the city of New York entered into an agreement with a private company under which the city purchased and restored certain of the ferry treminals.

Between these ferry structures at the foot of Broadway, Brooklyn, and Newtown Creek the property is privately owned, except at the foot of North Fifth Street, where the city has built a recreation pier, and at the foot of Noble Street, where the city has built a public pier.

The terminal of the Nassau Ferry Co., operating to the foot of East Houston Street, Manhattan, is located at the foot of Grand Street, Brooklyn.

The sugar refinery of the Havemeyer & Elder Co. is located in this district.

The Brooklyn Eastern District Terminal Co. owns a considerable portion of this water front (between Williamsburg Bridge and Newtown Creek) and also a considerable amount of upland.

Near the mouth of Newtown Creek are some lumber yards. The State of New York proposes to acquire a site here for a terminal of the barge canal.

Newtown Creek, which is an arm of the East River, extends eastward into Brooklyn for about 5½ miles, and on its shores are many important industries. The city of New York has acquired property on the south side of this creek at what is known as Whale Creek, where public docks have been constructed.

*East River (Borough of Queens).*—North of Newtown Creek is located one of the sugar refineries of the Havemeyer Co., and then comes the ferry and terminal properties of the Long Island Railroad Co.; north of this are extensive holdings of the Standard Oil Co.

On Dutchkills Creek, which extends northward from Newtown Creek, a terminal company is laying out a large area of land as a modern terminal, served by railroads and waterways.

Opposite Blackwells Island on the Queens Borough shore the water front has not been extensively developed, probably because of the narrowness of the channel, the swiftness of the current at certain stages of the tide, and the existence of rock in the river bed.

A number of important industries have, however, located on the upland and the Long Island City business men have advocated the establishment of a public terminal near the foot of Nott Avenue.

North of this proposed public terminal site, one of the large terminal companies in the harbor is said to have acquired water-front property and to contemplate the establishment of a terminal of its own, where freight may be received for and delivered from any carrier doing business in the harbor.

North of Blackwells Island, at the foot of Jamaica Avenue, the city has constructed a public pier, and north of this and just south of Hell Gate are private ferry terminals. There is no development on the water front through Hell Gate until Astoria is reached, where the Consolidated Gas Co. has bought a large frontage and established its principal plant, connecting it with The Bronx by tunnel.

North and east of Astoria there are no commercial developments along the water front, but the low-lying section south of Flushing is now in the possession of a terminal company and is being developed and being made available for manufacturing.

North and east of Flushing Bay the water front is devoted principally to residences.

The city of New York makes use of several of the islands in the East River and Long Island Sound for the purposes of its institutions. City Island and Rikers Island are used for prison and correction purposes, and the latter is being enlarged considerably by the deposit of street cleaning department wastes. North Brother Island and South Brother Island are used for hospitals for contagious diseases, while Blackwells Island

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is used both by the department of correction and the department of charities, for prison and hospital purposes.

Wards Island is used by the State for hospitals for the insane, while Randalls Island is used by the State for a reformatory.

*Ocean frontage (Boroughs of Queens and Brooklyn).*—The ocean frontage of the Boroughs of Queens and Brooklyn is largely used for summer colonies and recreation resorts. There is little likelihood of any commercial development being made on the ocean frontage.

### NEW JERSEY SECTION OF THE HARBOR.

*Sandy Hook to Raritan River.*—In the New Jersey section of the harbor between Sandy Hook and the Raritan River, there is no commercial development, but a few piers have been built as boat landings and for recreation and amusement purposes and for the fishing and oyster business.

*Arthur Kill.*—The New Jersey shore of the Arthur Kill, with its adjacency to the Central Railroad and its opportunities for rail and water connections, has been bought and developed by many large industrial corporations, but extensive as have been the developments, they are slight compared with those that are possible along this valuable waterway.

*Kill Van Kull.*—The Bayonne shore front of the Kill Van Kull, which, until a few years ago, was a popular summer resort for residents of Hudson County, is now developed along almost its entire length with large industrial plants.

*Newark Bay.*—On the Newark Bay shore of Bayonne, between Bergen Point and West Fifth Street, there has been a rapid industrial growth in recent years.

The development of the shores of Newark Bay has scarcely commenced. The city of Newark is constructing a terminal on Newark Bay and has acquired considerable property.

*Upper New York Bay.*—Between Constable Point and Communipaw, there are fully 5 square miles of shoal water, mostly in an undeveloped condition. This is one of the most advantageously located water fronts in New York Harbor.

The Pennsylvania Railroad Co. has dredged a channel and developed a terminal in this section at Greenville, as has the Lehigh Valley Railroad at Black Tom.

The Lehigh Valley Railroad's terminal at Black Tom, known as the National Docks, consists of warehouses, piers, and grain elevators, and south of this is an extensive plant of the Standard Oil Co.

*Hudson River (New Jersey section).*—North of Black Tom, the Central Railroad of New Jersey has its principal tidewater terminal and is increasing the upland by dredging in the channel and pumping the excavated material behind bulkheads. This company is building piers and is now handling some steamship business directly alongside its railroad cars.

North of the Jersey Central's property, the Lehigh Valley has located its terminal and constructed lighterage piers and transfer bridges for conducting its business in New York Harbor.

North of this is the so-called Tidewater Basin, a considerable portion of the shores of which is privately owned, but Jersey City owns an important part. This tidewater basin handles a large amount of commerce.

The Morris Canal empties into the Hudson just north of this basin.

Between Morris Street and Sixth Street, Jersey City, the water front is controlled mostly by the Pennsylvania Railroad Co.; but at the foot of Morgan Street Jersey City has built a pier and devoted it to public wharfage. South of Exchange Place are piers used by the Lloyd Sabaudo, and other steamship companies, and property used for shipbuilding and repairing and for general wharfage. At Exchange Place is the Pennsylvania Railroad Ferry Terminal. The Pennsylvania property north of this is devoted to car yards, transfer bridges for handling cars for car floats, piers for lighterage business, coal-unloading piers, and a grain elevator.

North of the Pennsylvania Railroad property is the property of the Jersey City Stockyards Co., from which a large amount of live stock is distributed about the harbor, and cattle ships sail for foreign ports.

North of this is the Erie Railroad Co.'s property, south and north of Pavonia Avenue, consisting of a ferry terminal, car yards, transfer bridges, lighterage piers, coal-unloading piers, and a grain elevator. Recently grain has been loaded from this grain elevator directly into seagoing ships.

North of the Erie Railroad's property is the property of the Lackawanna Railroad, which is used in about the same manner as the Erie's and the Pennsylvania's to the south.

North of the Lackawanna Railroad Co.'s property in Hoboken is the principal steamship terminal in the New Jersey section of New York Harbor. Here are three

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piers occupied by the Hamburg-American Line, three by the North German Lloyd, one by the Holland-American Line, and one by the Wilson Line.

The Hoboken Shore Road, which connects with practically all of the New Jersey railroads, has a track in the rear of these piers.

North of these steamship piers is a section of water front devoted to the building-material business; then there is a pier used for coaling tugboats and harbor craft. Immediately north of Castle Point are located the marine shops and repair plant of the Pennsylvania Railroad.

The Campbell Stores, which do a general warehousing and forwarding business, are located on the Hudson River at Sixth and Fourteenth Streets, Hoboken, and have bulkheads and direct rail connections.

North of this is a pier formerly used by the Panama Railroad Co., but now falling into disuse. North of this, and immediately south of the Fourteenth Street Ferry, is an important shipbuilding and repair plant, and north of the ferry is the station of the company operating floating grain elevators. At the southerly entrance to Weehawken Avenue and north of the ferry is the long dock of the Scandinavian-American Line.

In the Weehawken Cove is the shipyard of Tietjen & Lang. North of this is a fine stretch of water front owned and occupied by the Erie Railroad Co. From this terminal the railroad conducts a large amount of its lighterage business. Storage warehouses are located in the back lands and railroad tracks connect the warehouses and the piers.

North of the Erie Co. frontage is a coal-unloading pier, formerly used by the Delaware & Hudson Railroad Co., but at the present time being dismantled. Between this point and Weehawken, the Palisades are directly back of the Jersey Junction Railroad tracks, which run along the shore, and a space in front of these tracks is being filled in in order to create additional land for tracks and other purposes.

At Weehawken is located the terminal of the West Shore Railroad, with extensive yards and transfer bridges, piers for lighterage service, ferry terminals, and grain elevators.

North of the West Shore property are the coal-unloading piers of the New York, Ontario & Western Railroad, immediately north of which, at Guttenberg, is the plant of the American Cotton Oil Co. North of this, a private company contemplates an extensive terminal development of piers and warehouses.

North of Shady Side, as far as the terminal of the One hundred and thirtieth Street Ferry from New York, a number of industrial plants have been established. North of this is a pier devoted to excursion traffic, and then there are properties used for the storage of excursion boats and of dock-building plants. North of this the Palisades are directly along the river bank and the Palisade Park Reservation has control.

*Passaic and Hackensack Rivers.*—The Passaic River has many important manufactories located on its banks all the way from its mouth to above Newark. A short way above Newark there are obstructions in the bed of the river which limit the draft of boats to 5 feet.

Some important industries are located on the Hackensack River, but the shoal water at its mouth has held back its development.

Details as to length and width of piers, and the occupants and owners of piers, ferries, and other improvements are given in the following table for the principal portions of the Hudson and East Rivers within the Borough of Manhattan, of the East River in Brooklyn Borough, and of the South Brooklyn water front:

| Pier. | Location. | Length. | Width. | Occupant. | Owner. |
|---|---|---|---|---|---|
| HUDSON RIVER, MANHATTAN BOROUGH. | | | | | |
| | | *Feet.* | *Feet.* | | |
| Pier A | Battery Place. | 280 | 41 | Department of docks and ferries | City. |
| Pier 1 (new) | do | 500 | 80 | Middlesex Transportation Co., Iron Steamboat Co., and Wright & Cobb Lighterage Co. | Do. |
| Pier 1 (old) | do | 525 | 65 | United Fruit Co | Private. |
| Pier 2 | | 464 | 42 | Lehigh Valley R. R | Pennsylvania R. R. |
| Pier 3 | | 426 | 42 | do | Private. |
| Pier 4 | | 421 | 80 | Pennsylvania R. R | Pennsylvania R. R. |
| Pier 5 | | 438 | 80 | do | Do. |
| Pier 6 | | 544 | 42 | do | Private. |
| Pier 7 | | 656 | 100 | Baltimore & Ohio R. R | Do. |

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| Pier. | Location. | Length. | Width. | Occupant. | Owner. |
|---|---|---|---|---|---|
| HUDSON RIVER, MANHATTAN BOROUGH—contd. | | Feet. | Feet. | | |
| Pier 8 | Rector St | 724 | 75 | Central R. R. of New Jersey | City. |
| Pier 9 | Carlisle St | 761 | 60 | do | Do. |
| Pier 10 | Albany St | 753 | 80 | do | Do. |
| Pier 11 | Cedar St | 779 | 50 | do | Do. |
| Ferry slip | Liberty St | | | do | Do. |
| Do | Cortlandt St | | | Pennsylvania R. R | Pennsylvania R. R. |
| Do | do | | | do | Do. |
| Pier 13 | do | 724 | 100 | Delaware, Lackawanna & Western R. R. | John H. Starin. |
| Pier 14 | Fulton St | 722 | 125 | New England Navigation Co | City. |
| Pier 15 | Vesey St | 714 | 45 | do | Do. |
| Ferry slip | Barclay St | | | Delaware, Lackawanna & Western R. R. | Do. |
| Pier 16 | do | 711 | 50 | New York Central R. R. | Rhinelander Estate. |
| Pier 17 | Park Place | 711 | 55 | do | Do. |
| Pier 18 | Murray St | 843 | 60 | New England Navigation Co | Do. |
| Pier 19 | Warren St | 843 | 45 | do | City. |
| Ferry slip | Chambers St | | | Erie R. R. | Do. |
| Pier 20 | do | 849 | 80 | do | Do. |
| Pier 21 | Duane St | 848 | 100 | do | Do. |
| Pier 22 | Jay St | 858 | 75 | Baltimore & Ohio R. R | Do. |
| Ferry slip | Harrison St | | | West Shore R. R | Do. |
| Pier 23 | do | 858 | 70 | do | Do. |
| Pier 24 | Franklin St | 857 | 60 | Central Hudson Steamboat Co | Do. |
| Pier 25 | North Moore St. | 991 | 75 | Old Dominion Steamship Co | Do. |
| Pier 26 | Beach St | 996 | 80 | do | Do. |
| Pier 27 | Hubert St | 1,000 | 75 | Pennsylvania R. R | Do. |
| Pier 28 | Laight St | 851 | 75 | do | Do. |
| Pier 29 | Vestry St | 1,006 | 80 | do | Do. |
| Pier 30 | Desbrosses St | | 60 | Albany Day Line | Do. |
| Ferry slip | do | | | Pennsylvania R. R | Do. |
| Pier 31 | Watts St | 845 | 60 | New York Central R. R | Do. |
| Pier 32 | Canal St | 840 | 65 | Hudson Navigation Co | Private. |
| Pier 33 | do | 842 | 40 | Public; also street-cleaning department. | City. |
| Pier 34 | do | 843 | 90 | Lehigh Valley R. R | Do. |
| Pier 35 | Spring St | 1,019 | 62 | Ocean Steamship Co | Do. |
| Pier 36 | Charlton St | 1,003 | 75 | Clyde Steamship Line | Do. |
| Pier 37 | do | 988 | 80 | do | Do. |
| Pier 38 | King St | 974 | 75 | do | Do. |
| Pier 39 | West Houston St. | 957 | 75 | Central Railroad of New Jersey | Do. |
| Pier 40 | Clarkson St | 816 | 75 | New England Navigation Co | Do. |
| Pier 41 | Leroy St | 921 | 80 | Delaware, Lackawanna & Western R. R. | Do. |
| Pier 42 | Morton St | 906 | 75 | Royal Mail Steam Packet Co | Do. |
| Pier 43 | Barrow St | 888 | 50 | Recreation pier; also Hudson River boats. | Do. |
| Ferry slip | Christopher St. | | | Delaware, Lackawanna & Western R. R. | Do. |
| Pier 44 | do | 661 | 50 | Lehigh Valley R. R | Do. |
| Pier 45 | West 10th St | 833 | 80 | do | Do. |
| Pier 46 | Charles St | 677 | 60 | Hudson Navigation Co. and Central R. R. of New Jersey. | Do. |
| Pier 47 | Perry St | 478 / 604 | 50 | Quebec Steamship Co | Do. |
| Pier 48 | West 11th St | 732 | 125 | Southern Pacific Co | Do. |
| Pier 49 | Bank St | 720 | 125 | do | Do. |
| Pier 50 | Bethune St | 709 | 125 | do | Do. |
| Pier 51 | Jane St | 689 | 110 | do | Do. |
| Pier 52 | Gansevoort St. | 679 | 70 | do | Do. |
| Gansevoort St. Pier, South. | do | 375 | 38 | Public wharfage | Do. |
| Gansevoort St. Pier, Middle. | do | 358 | 38 | do | Do. |
| Gansevoort St. Pier, North. | do | 342 | 38 | do | Do. |
| Pier 53 | Bloomfield St. | 825 | 50 | Cunard Steamship Co. (Ltd.) | Do. |
| Pier 54 | West 13th St | 825 | 100 | do | Do. |
| Pier 56 | West 14th St | 825 | 109 | do | Do. |
| Pier 57 | West 15th St | 825 | 125 | Compagnie Generale Transatlantique. | Do. |
| Pier 58 | West 16th St | 825 | 125 | Atlantic Transport Line | Do. |
| Pier 59 | West 18th St | 825 | 125 | Red Star Line | Do. |
| Pier 60 | West 19th St | 800 | 125 | White Star Line | Do. |
| Pier 61 | West 21st St | 800 | 125 | do | Do. |
| Pier 62 | West 22d St | 800 | 60 | American Line | Do. |
| Ferry slip | West 23d St | | | Central R. R. of New Jersey | Do. |
| Do | do | | | Delaware, Lackawanna & Western R. R. | Do. |

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| Pier. | Location. | Length. | Width. | Occupant. | Owner. |
|---|---|---|---|---|---|
| HUDSON RIVER, MANHATTAN BOROUGH—contd. | | *Feet.* | *Feet.* | | |
| Ferry slip | West 23d St. | | | Erie R. R. | City. |
| Pier 63 | do | 762 | 45 | American & Cuban Steamship Co. | Do. |
| Pier 64 | West 24th St. | 538 | 80 | Anchor Steamship Co | Do. |
| Pier 65 | West 25th St. | 512 | 80 | Hamburg-American Steamship Co. | Do. |
| Car transfer slip | West 26th St. | | | Baltimore & Ohio R. R. | Do. |
| Pier 66 | do | 512 | 80 | do | Do. |
| Car transfer slip | West 27th St. | | | Lehigh Valley R. R. | Do. |
| Pier 67 | do | 512 | 80 | Panama Railroad Steamship Line and Erie R. R. | Do |
| Car transfer slip | West 28th St. | | | Terminal Warehouse Co. and Erie R. R. | Do. |
| Pier 68 | do | 512 | 60 | Delaware, Lackawanna & Western R. R. | Do. |
| Pier 69 | West 29th St. | 512 | 60 | Occident Dock Co | Do. |
| Pier 70 | West 30th St. | 702 | 60 | Department of Street Cleaning | Do. |
| Pier 71 | West 31st St. | 701 | 100 | Cunard Steamship Co. (Ltd.) | Do. |
| Pier 72 | West 32d St. | 507 | 100 | New York Central R. R. | Do. |
| Car transfer slip | West 33d St. | | | do | Do. |
| Pier 73 | do | 700 | 60 | do | Do. |
| Pier 74 | West 34th St. | 700 | 100 | Italian Royal Mail Steamship Co. | Do. |
| Pier 75 | West 35th St. | 736 | 60 | Dumping board and New York & Long Branch Steamboat Co. | Do. |
| Pier 76 | West 36th St. | 740 | 50 | New York Central R. R. | Do. |
| Pier 77 | West 37th St. | 547 | 60 | Pennsylvania R. R. | Do. |
| Car transfer slip | do | | | do | Do. |
| Pier 78 | West 38th St. | 506 | 60 | do | Do. |
| Pier 79 | West 39th St. | 694 | 60 | City Health Department, New York Butchers Dressed Meat Co. and others. | Do. |
| Pier 80 | West 40th St. | 700 | 60 | Central R. R. of New Jersey | Do. |
| Pier 81 | West 41st St. | 953 | 60 | Albany Day Line | Do. |
| Coal dock | do | | | Consolidated Gas Co | Consolidated Gas Co. |
| Ferry slip | West 42d St. | | | West Shore R. R | City. |
| Pier 83 | West 43d St. | 700 | 100 | New York Central R. R. | Do. |
| Pier 84 [a] | West 44th St. | 700 | 100 | Compagnie Generale Transatlantique. | Do. |
| Pier 85 [a] | do | 1,000 | 150 | | Do. |
| Pier 86 | West 46th St. | 1,000 | 150 | | Do. |
| Pier 87 | West 47th St. | 558 | 60 | City Street Cleaning Department. | Do. |
| Pier 88 | West 48th St. | 565 | 60 | Public; also Texas Oil Co. and Merchants Union Ice Co. | Do. |
| Pier 89 | West 49th St. | 504 | 60 | Erie R. R | Do. |
| Pier 90 | West 50th St. | 700 | 60 | Recreation pier | Do. |
| Pier 91 | West 51st St. | 700 | 80 | Public; also Cornell Steamboat Co. | Do. |
| Pier 92 | West 52d St. | 700 | 60 | Public | Do. |
| Canal basin | West 52d to 54th Sts. | | 462 | | Do. |
| Pier 94 | West 54th St. | 699 | 60 | | Do. |
| Pier 95 | West 55th St. | 702 | 60 | Furness, Withy & Co | Do. |
| Pier 96 | West 56th St. | 500 | 60 | Italian lines | Do. |
| Pier 97 | West 57th St. | 698 | 70 | do | Do. |
| Pier 98 | West 58th St. | 702 | 60 | Interborough Rapid Transit Co | Do. |
| Pier 99 | West 59th St. | 699 | 59 | New York Central R. R. | Do. |
| Pier 99B | West 63d St. | 472 | 100 | do | New York Central R. R. [b] |
| Pier 99D | West 64th St. | 511 | 100 | do | Do. |
| Pier 99E | West 65th St. | 500 | 100 | do | Do. |
| Pier 99F | West 66th St. | 496 | 100 | do | Do. |
| Pier 99G | West 67th St. | 500 | 100 | do | Do. |
| Car transfer slip | West 68th to 69th Sts. | | | do | Do. |
| Pier 99H | West 69th to 70th Sts. | 795 | 60 | do | Do. |
| Bulkhead wharf | West 70th to 72d Sts. | | 465 | do | Do. |
| Undeveloped front | West 72d to 79th Sts. | | | Riverside Park | City. |
| Pier | West 79th St. | 468 | 180 | New York Contracting & Trucking Co. | Do. |
| Do | West 80th St. | 456 | 60 | | Do. |
| Undeveloped front | West 80th to 96th Sts. | | | Riverside Park | Do. |
| Pier | West 96th St. | 500 | 60 | New York Contracting & Trucking Co. | Do. |
| Do | West 97th St. | 500 | 100 | Public; also department of street cleaning. | Do. |
| Undeveloped front | West 98th to 129th Sts. | | | Department of Parks (Riverside Drive). | Do. |

[a] Half pier.

[b] The ends of streets belong to the city.

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| Pier. | Location. | Length. | Width. | Occupant. | Owner. |
|---|---|---|---|---|---|
| HUDSON RIVER, MANHATTAN BOROUGH—contd. | | | | | |
| | | *Feet.* | *Feet.* | | |
| Pier | West 129th St. | 221 | 60 | Recreation pier and public wharfage. | City. |
| Ferry slip | West 130th St. | | | Riverside & Fort Lee Ferry Co. | Do. |
| Pier | West 131st St. | 392 | 80 | Manhattan Navigation Co. | Do. |
| Do | West 132d St. | 402 | 60 | Hudson Navigation Co. | Do. |
| Do | West 133d St. | 353 | 60 | Public dump | Do. |
| Do | West 134th St. | 510 | 60 | Department of street cleaning | Do. |
| Do | West 135th St. | 543 | 60 | Public wharfage | Do. |
| EAST RIVER, MANHATTAN BOROUGH. | | | | | |
| Ferry slip | Battery Park. | | | | Do. |
| Do | ....do | | | | Do. |
| Do | ....do | | | Ellis Island ferry | United States. |
| Do | South St. | | | Municipal ferry to St. George, Staten Island. | City. |
| Do | ....do | | | ....do | Do. |
| Do | ....do | | | Union Ferry Co. to Hamilton Ave., Brooklyn. | Do. |
| Do | ....do | | | Union Ferry Co. to Atlantic Ave., Brooklyn. | Do. |
| Do | ....do | | | Municipal ferry to South Brooklyn. | Do. |
| Do | ....do | | | ....do | Do. |
| Do | ....do | | | ....do | Do. |
| Pier 4 | Broad St. | 565 | 70 | New York Central R. R. | Do. |
| Pier 5 | Coenties Slip. | 571 | 70 | Public (Erie Canal terminals) | Do. |
| Pier 6 | ....do | 572 | 50 | ....do | Do. |
| Pier 7 | ....do | 571 | 60 | Erie R. R. and Atlantic Fruit Co. | Do. |
| Pier 8 | Cuylers Alley. | 568 | 60 | Compania Transatlantica | Do. |
| Pier 9 | Old Slip | 563 | 60 | Munson Steamship Co | Do. |
| Pier 10 | ....do | 556 | 60 | New York & Baltimore Transportation Co. and Enterprise Transportation Co. | Do. |
| Pier 11 | Jones Lane | 547 | 60 | Public wharfage | Do. |
| Pier 12 | Wall St. | 545 | 45 | United States Government | Do. |
| Pier 13 | Pine St. | 545 | 60 | New York & Cuba Mail Steamship Co. | Do. |
| Pier 14 | Maiden Lane. | 549 | 80 | ....do | Do. |
| Pier 15 | Fletcher St. | 556 | 80 | United Fruit Co | Do. |
| Pier 16 | Fulton St. | 560 | | Metropolitan Steamship Co | Do. |
| Ferry slip | ....do | | | Union Ferry Co. to Fulton St., Brooklyn. | Do. |
| Pier 17 | ....do | 562 | 40 | Fulton Market Fish Mongers' Association. | Do. |
| Pier 18 | Beekman St. | 557 | 40 | Independent Wholesale Fish Dealers' Association and New York Wholesale Fish Dealers' Association. | Do. |
| Pier 19 | Peck Slip | 554 | 75 | Hartford & New York Transportation Co. | Do. |
| Pier 20 | ....do | 541 | 75 | ....do | Do. |
| Pier 21 | Dover St. | 531 | 75 | Baltimore & Ohio R. R | Do. |
| Brooklyn Bridge Pier | Roosevelt St. | | | | Do. |
| Ferry slip | ....do | | | Brooklyn & Manhattan Ferry Co., to Broadway, Brooklyn. | Do. |
| Pier 22 | James Slip | 236 | 60 | Long Island R. R | Do. |
| Pier 25 | Oliver St. | 528 | 70 | ....do | Do. |
| Pier 26 | Catherine Slip | 505 | 45 | Delaware, Lackawanna & Western R. R. | Do. |
| Bulkhead | Catherine St. | | | Baltimore & Ohio R. R | Do. |
| Pier 27 | ....do | 462 | 50 | Delaware, Lackawanna & Western R. R. | Do. |
| Pier 28 | Market Slip | 458 | 80 | New England Navigation Co | Do. |
| Pier 29 | ....do | 443 | 70 | Central Vermont Railway | Do. |
| Pier 30 | | 434 | 70 | Public, also recreation pier | Do. |
| Pier 31 | Pike Slip | 428 | 60 | New England Navigation Co | Do. |
| Floating oyster house. | Under Manhattan Bridge. | | | Oyster dealers | Do. |
| Pier 32 | Pike Slip | 423 | 80 | Maine Steamship Co. and Seaboard & Gulf Steamship Co. | Do. |
| Pier 33 | Rutgers Slip. | 422 | 80 | Public | Do. |
| Pier 34 | ....do | 425 | 80 | New York Central R. R. | Do. |
| Pier 45 (old) | Jefferson St. West | 428 | 57 | ....do | Do. |
| Pier 36 | ....do | 425 | 60 | N. Y., N. H. & H. R. R | Do. |
| Pier 37 | Clinton St. | 423 | 75 | ....do | Do. |
| Pier 38 | Montgomery St. | 430 | 50 | ....do | Do. |

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| Pier. | Location. | Length. | Width. | Occupant. | Owner. |
|---|---|---|---|---|---|
| EAST RIVER, MANHATTAN BOROUGH—contd. | | | | | |
| | | *Feet.* | *Feet.* | | |
| Pier 33 | Montgomery St. | 245 | 50 | N. Y., N. H. & H. R. R. | N. Y., N. H. & H. R. R. |
| Pier 40 | Gouverneur Slip. | 233 | 60 | .....do | City. |
| Pier 41 | .....do | 228 | 60 | .....do | Do. |
| Pier 42 | .....do | 217 | 60 | .....do | Do. |
| Pier 43 | .....do | 207 | 60 | Public; also department of street cleaning. | Do. |
| Pier 44 | Jackson St | 193 | 60 | Lehigh Valley R. R. Co | Do. |
| Pier 45 | | 181 | 60 | | |
| Undeveloped front | Jackson to Grand Sts. | | | Corlear's Hook Park | Do. |
| Pier 55 (old) | Grand St | 210 | 50 | Fire department | Do. |
| Ferry slip | .....do | | | Municipal ferry to Broadway, Brooklyn. | Do. |
| Do | .....do | | | Bridge department | Rosalie Steel Estate. |
| Pier 56 (old) | Broome St | 252 | 37 | .....do | Rosalie Steel Estate and New York & Brooklyn Ferry Co. |
| Pier 47 | Delancey St | | | | Do. |
| Pier 48 | .....do | 256 | 20 | Department of street cleaning | Do. |
| Williamsburg Bridge. | | | | | Do. |
| Pier 50 | Rivington St | 222 | 50 | Ice | Do. |
| Pier 51 | Rivington to Stanton Sts. | 366 | 60 | Dumping boards | Do. |
| Pier 52 | Stanton St | 341 | 60 | James Shewan & Sons | Do. |
| Pier 53 | | | | | Nassau Ferry Co. |
| Ferry slip | East Houston St. | | | Nassau Ferry Co. to Grand St., Brooklyn. | Do. |
| Pier 54 | | | | | Law Estate. |
| Pier 55 | East 3d St | 354 | 60 | Public; also Recreation Pier | Do. |
| Pier 56 | East 4th St | 342 | 60 | James Shewan & Sons (dry dock) | Do. |
| Pier 57 | East 5th St | 461 | 60 | Miscellaneous permits | Do. |
| Pier 58 | East 6th St | 255 | 33 | | Private. |
| Pier 59 | East 7th St | 242 | 41 | Miscellaneous permits | City. |
| Pier 60 | East 8th St | 411 | 42 | .....do | Do. |
| Pier 61 | East 9th St | 400 | 60 | John W. Sullivan Co | Do. |
| Pier 62 | East 10th St | 261 | 60 | Miscellaneous permits | Do. |
| Ferry slip | .....do | | | | Law Estate. |
| Pier 70 (old) | East 11th St | 360 | 50 | Law Estate | City. |
| Pier 64 | East 12th St | | | Consolidated Gas Co | Do. |
| Pier 72 (old) | East 13th St | 222 | 35 | .....do | Consolidated Gas Co. |
| Bulkhead | East 14th St | | | | Do. |
| Do | .....do | | | General wharfage | City. |
| Undeveloped front | East 14th to 15th Sts. | | | Consolidated Gas Co | Consolidated Gas Co. |
| Do | East 15th to 17th Sts. | | | Willard Parker Hospital | City. |
| Pier 66 | East 18th St | 532 | 66 | Ice and coal permits and others | Do. |
| Pier 67 | East 19th St | 555 | 60 | Ice and coal permits and model street cleaning dump. | Do. |
| Pier 68 | East 20th St | 580 | 58 | .....do | Do. |
| Pier 69 | East 21st St | 600 | 60 | Consolidated Gas Co., O'Brien Bros. and dump. | Do. |
| Pier 70 | East 22d St | 625 | 66 | New England Navigation Co | Do. |
| Ferry slip | East 23d St | | | Brooklyn & Manhattan Ferry Co. | Do. |
| Do | .....do | | | Interborough Ferry Co. to Greenpoint. | Do. |
| Pier 72 | East 24th St | 820 | 60 | Public; also recreation pier | Do. |
| Pier 73 | East 25th St | 707 | 60 | Department of docks and ferries | Do. |
| Pier 74 | East 26th St | 660 | 60 | Department of charities | Do. |
| Pier 76 | East 28th St | 530 | 60 | Bellevue Hospital | Do. |
| Pier 77 | East 29th St | 217 | 60 | .....do | Do. |
| Pier 78 | East 30th St | 361 | 61 | Public; also department of street cleaning. | Do. |
| Pier 79 | East 31st St | 295 | 60 | Public | Do. |
| Pier 80 | East 32d St | 235 | 60 | .....do | Do. |
| Pier 81 | East 33d St | 258 | 40 | Public; also Henry Steere, dump. | Do. |
| Ferry slip | East 34th St | | | Long Island R. R | Private |
| Do | .....do | | | .....do | City. |
| Pier 84 | .....do | 186 | 40 | | Do. |
| Pier 85 | East 35th St | 210 | 60 | Crescent Delivery Co | Do. |
| Pier 86 | East 36th St | 227 | 60 | Miscellaneous permits | Do. |
| Pier 87 | East 37th St | 235 | 60 | .....do | Do. |
| Pier 88 | East 38th St | 146 | 60 | .....do | Do. |
| Pier 89 | East 39th St | 108 | 60 | Edison Electric Co | Do. |

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| Pier. | Location. | Length. | Width. | Occupant | Owner. |
|---|---|---|---|---|---|
| EAST RIVER, MANHATTAN BOROUGH—contd. | | *Feet.* | *Feet.* | | |
| Bulkhead | East 40th to 46th Sts. | | | P. F. & W. A. Kane, street cleaning dump. | City. |
| Do | East 46th to 60th Sts. | | | | Do. |
| Do | East 60th St. | | | Bradley Improvement Co. and others. | Do. |
| Do | East 62d St. | | | Miscellaneous permits, ice, etc. | Do. |
| Bulkhead | East 62d to 90th Sts. | | | | City and private. |
| EAST RIVER, BROOKLYN BOROUGH, NORTH OF BROOKLYN BRIDGE. | | | | | |
| Pier 3 | Brooklyn Bridge to Main St. | 191 | 105 | | Jay Street Terminal. |
| Pier 2 | do | 355 | 55 | | Do. |
| Pier 1 | do | 408 | 35 | | Do. |
| Municipal bulkhead. | Washington St. | 314 | 30 | | City. |
| Pier | Adams St. | 289 | 30 | | Do. |
| Bulkhead | Adams to Jay St. | | | | Private. |
| Pier | Jay St. | | | | City. |
| Do | do | | | | Do. |
| Bulkhead | Jay to Gold St. | | | | Private. |
| Municipal pier | Gold St. | 103 | 60 | | City. |
| Pier | Hudson St. | 174 | 47 | | Do. |
| United States navy yard. | Wallabout Basin. | | | | United States. |
| Municipal Pier 5 | do | 410 | 60 | Lehigh Valley R. R. and Chas. Shaefer & Son. | City. |
| Municipal Pier 4 | do | 475 | 60 | Baltimore & Ohio R. R. and Knickerbocker Ice Co. | Do. |
| Municipal Pier 3 | do | 670 | 60 | New York Central R. R. | Do. |
| Municipal Pier 2 | do | 710 | 90 | Pennsylvania R. R | Do. |
| Municipal Pier 1 | do | 680 | 70 | Brooklyn Ash Remover Co. (Inc.) | Do. |
| Ferry slip | South 9th St. | | | | Private. |
| Do | South 8th St. | | | | Do. |
| Do | Broadway | | | | City. |
| Do | South 6th St. | | | | One-half city. |
| Williamsburg Bridge. | | | | | City. |
| Municipal pier | South 5th St. | | | Public, also Boyers Freight Line. | Do. |
| Pier | do | 260 | 40 | American Sugar Refining Co. | Amer. Sugar Refining Co. |
| Do | South 3d St. | 300 | 60 | do | Do. |
| Do | South 2d St. | 277 | 70 | do | Do. |
| Do | South 1st St. | 273 | 60 | do | Do. |
| Ferry slip | Grand St. | | | New York Terminal Co. | New York Terminal Co. |
| Do | do | | | Nassau Ferry Co. | Nassau Ferry Co. |
| Do | do | | | do | City. |
| Pier | North 2d St. | | | Recreation pier | Do. |
| Do | North 3d St. | 319 | 73 | | Brooklyn Eastern District Terminal. |
| Do | North 4th St. | 150 | 60 | | Do. |
| Do | do | 221 | 15 | | Do. |
| Do | do | 255 | 32 | | Do. |
| Do | North 5th St. | 400 | 48 | Pennsylvania R. R | Do. |
| Do | North 5th to 6th St. | 375 | 39 | West Shore R. R | Do. |
| Do | North 6th St. | 365 | 60 | do | Do. |
| Do | North 7th St. | 378 | 70 | | Do. |
| Do | North 8th St. | 440 | 30 | | Do. |
| Do | North 9th St. | 411 | 35 | | Do. |
| Do | North 10th St. | 393 | 20 | | Do. |
| Do | do | 262 | 35 | Standard Oil Co | Private. |
| Do | North 11th St. | 400 | 37 | do | Do. |
| Do | North 12th St. | 239 | 40 | do | Do. |
| Do | Quay St | 150 | 100 | | Do. |
| Do | Oak St. | 300 | 70 | American Ice Co | Do. |
| Municipal pier | Noble St. | 478 | 40 | Public | City. |
| Ferry slip | Greenpoint Ave. | | | Interborough Ferry Co. | Interborough Ferry Co. |

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| Pier. | Location. | Length. | Width. | Occupant. | Owner. |
|---|---|---|---|---|---|
| EAST RIVER, BROOKLYN BOROUGH, NORTH OF BROOKLYN BRIDGE—contd. | | *Feet.* | *Feet.* | | |
| Municipal pier | Whale Creek | 772 | 60 | General wharfage | City. |
| Pier | Kent St | 379 | 50 | W. Wilson & Co. (lumber) | Private. |
| Do | Java St | 286 | 40 | W. P. Uptegrove & Bro. (lumber) | Do. |
| Do | India St | | | J. C. Orr Lumber Co | Do. |
| Do | Huron St | | | W. P. Uptegrove & Bro. (lumber) | Do. |
| Do | Green St | 385 | 70 | New York & Boston Dyewood Co. (lumber). | Do. |
| Do | Freeman St | 361 | 55 | Constantine-Nesmith Rosewood Co. (lumber). | Do. |
| Do | Eagle St | 380 | 43 | Yellow Pine Co. (lumber) | Do. |
| Do | Dupont St | 398 | 72 | ...do | Do. |
| Do | West St | 223 | 34 | | Do. |
| EAST RIVER AND UPPER BAY, BROOKLYN BOROUGH, SOUTH OF BROOKLYN BRIDGE. | | | | | |
| Ferry slip | Fulton St | | | | City. |
| Do | ...do | | | | Do. |
| Jewell Mill Pier | ...do | 245 | 58 | | N. Y. Dock Co. |
| Pier 4 | Poplar St | 398 | 125 | Booth Steamship Line | Do. |
| Pier 5 | Middagh St | 437 | 70 | General cargo | Do. |
| Pier 6 | Cranberry St | 486 | 70 | ...do | Do. |
| Pier 7 | Orange St | 542 | 70 | ...do | Do. |
| Pier 8 | Pineapple St | 571 | 100 | Lamport & Holt Line | Do. |
| Pier 9 | ...do | 589 | 82 | General cargo | Do. |
| Pier 10 | Clark to Pierrepont Sts. | 599 | 80 | Commonwealth & Dominion Line. | Do. |
| Pier 11 | ...do | 607 | 75 | Red "D" Line | Do. |
| Pier 12 | Pierrepont St | 616 | 80 | General cargo | Do. |
| Car transfer slip | Montague St | | | | Do. |
| Ferry slip | ...do | | | Abandoned | City. |
| Pier 15 | ...do | 510 | 41 | General cargo | N. Y. Dock Co. |
| Pier 16 | Grace St | 560 | 77 | N. Y. & Cuba Mail S. S. Co | Do. |
| Pier 17 | Joralemon St | 567 | 75 | ...do | Do. |
| Pier 18 | ...do | 492 | 64 | General cargo | Do. |
| Pier 19 | State St | 705 | 82 | N. Y. & Cuba Mail S. S. Co | Do. |
| Ferry slip | Atlantic Ave | | | Union Ferry Co | Union Ferry Co. |
| Do | ...do | | | | City. |
| Pier 22 | Pacific St | 874 | 75 | Sicula-American Line | N. Y. Dock Co. |
| Pier 23 | ...do | 529 | 40 | | Do. |
| Pier 24 | Amity St | 740 | 75 | Trinidad Shipping & Trading Co. | Do. |
| Pier 26 | Congress St | 749 | 79 | Luckenback Steamship Co | Do. |
| Pier 27 | Baltic St | 702 | 73 | Bull-Insular Line | Do. |
| Car transfer slip | ...do | | | | Do. |
| Pier 29 | Harrison St | 676 | 78 | Anchor Line (Mediterranean service). | Do. |
| Pier 30 | Irving St | 562 | 74 | General cargo | Do. |
| Pier 31 | Sedgwick St | 476 | 73 | ...do | Do. |
| Pier 32 | Degraw St | 481 | 70 | Red Cross Line | Do. |
| Ferry slips | Hamilton Ave | | | Union Ferry Co | City. |
| Pier 33 | Atlantic Basin | 1,120 | 167 | Merchants Line and Atlantic & Pacific Steamship Co. | N. Y. Dock Co. |
| Pier 34 | ...do | 885 | 68 | Clyde Line (West Indies service) | Do. |
| Pier 35 | ...do | 798 | 78 | N. Y. & Porto Rico S. S. Co | Do. |
| Pier 36 | ...do | 885 | 78 | Barber Lines | Do. |
| Pier 37 | ...do | 730 | 80 | ...do | Do. |
| Pier 38 | ...do | 851 | 171 | Houston Lines | Do. |
| Car transfer bridge | ...do | | | Atlantic Dock Co | Do. |
| Pier 39 | Red Hook | 393 | 115 | General cargo | Do. |
| Pier 40 | ...do | 337 | 100 | ...do | Do. |
| Pier 41 | ...do | 369 | 200 | ...do | Do. |
| Marine ways | ...do | | | Johnson Lighterage Co | Do. |
| Pier 45 | ...do | 455 | 40 | General cargo | Do. |
| Pier 46 | ...do | 482 | 69 | ...do | Do. |
| Pier 46a | Erie Basin | | | Private | Private. |
| Pier 47 | ...do | | | ...do | Do. |
| Pier 48 | ...do | | | ...do | Do. |
| Pier 49 | ...do | | | ...do | Do. |
| Pier 50 | ...do | | | ...do | Do. |
| Dry dock | ...do | | | Robins Dry Dock Co | Robins Dry Dock Co. |
| Do | ...do | | | ...do | Do. |
| Pier 51 | ...do | | | General cargo | Do. |
| Dry dock | ...do | | | Theodore Crane Sons' Co | Private. |
| Do | ...do | | | ...do | Do. |

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| Pier. | Location | Length. | Width. | Occupant. | Owner. |
|---|---|---|---|---|---|
| EAST RIVER AND UPPER BAY, BROOKLYN BOROUGH, SOUTH OF BROOKLYN BRIDGE—contd. | | *Feet.* | *Feet.* | | |
| Gowanus Basin Pier | 17th to 18th Sts. | 300 | 50 | Miscellaneous | Private. |
| Do | 20th to 21st Sts. | 1,529 | 200 | ....do | Do. |
| Do | 23d St | 1,474 | 30 | ....do | Do. |
| Do | 23d to 24th Sts. | 1,538 | 30 | Tebo Yacht Basin | Realty Associates. |
| Do | 25th to 26th Sts. | 1,585 | 200 | Miscellaneous | Private. |
| Do | 26th to 27th Sts. | 1,495 | 125 and 35 | D., L. & W. R. R. Co | D., L. & W. R. R. C. |
| Do | 27th St | 735 | 150 | Miscellaneous | Wm. Starr. |
| Municipal pier | 29th St | 1,198 | 80 | United States Steel Products Co. | City. |
| Do | 30th St | 1,324 | 125 | Norwegian-America Line | Do. |
| Do | 31st St | 1,475 | 150 | Fabre Line | Do. |
| Do | 33d St | 1,617 | 150 | Hamburg-American Steamship Co. | Do. |
| Do | 35th St | 1,779 | 150 | Luckenbach Steamship Co | Do. |
| Ferry slip | 39th St | | | Municipal ferry to Whitehall St., Manhattan. | Do. |
| Bush Pier 7 | 40th St | 1,549 | 150 | | Bush Terminal Co. |
| Bush Pier 6 | 42d St | 1,241 | 270 | | Do. |
| Bush Pier 5 | 44th St | 1,315 | 150 | | Do. |
| Bush Pier 4 | 45th St | 1,335 | 150 | Various parties | Do. |
| Bush Pier 3 | 47th St | 1,337 | 150 | | Do. |
| Bush Pier 2 | 49th St | 1,337 | 150 | | Do. |
| Bush Pier 1 | 50th St | 1,337 | 150 | | Do. |
| Pier | 51st St | 600 | 60 | Naval Reserve Armory | City. |
| Do | 52d St | (a) | (a) | Brooklyn Heights R. R. Co. power house. | Private. |
| Do | 53d St | (a) | (a) | United States Projectile Co | E. W. Bliss. |
| Do | 54th St | (a) | (a) | Kings County Gas Co | Kings County Gas & Illuminating Co. |
| Do | 55th St | (a) | (a) | Morse Iron Works & Repair Co | Morse Iron Works & Repair Co. |
| Dry dock | 56th St | (a) | (a) | ....do | Do. |
| Pier | 57th St | (a) | (a) | ....do | Do. |
| Do | 58th St | (a) | (a) | | City. |
| Do | 63d St | 1,500 | 75 | Vacant | Private. |
| Do | 64th St | 610 | 60 | ....do | Do. |
| Car transfer bridges. | 65th St | | | Bay Ridge Freight Terminal, Pennsylvania R. R. | Do. |
| | 66th St | | | New York Edison Co | Do. |
| Shore drive | 66th St. to Bay Ridge Ave. | | | Department of Parks | City. |
| Municipal pier | Bay Ridge Ave. | 760 | 47 | Public | Do. |
| Shore drive | Bay Ridge Ave. to Fort Hamilton. | | | Department of Parks | Do. |
| UPPER NEW YORK BAY, STATEN ISLAND. | | | | | |
| Pier 1 | | 724 | 70 | Houlder, Weir & Boyd | American Dock Co. |
| Pier 2 | | 760 | 100 | ....do | Do. |
| Pier 3 | | 1,000 | 85 | General wharfage | Do. |
| Piers 4 and 5 | | 835 | 175 | Oriental Operating Co | Do. |
| Pier 6 | | 265 | 110 | General wharfage | Do. |

a Data not available.

*Steamship terminals.*—The piers occupied by the principal transoceanic lines of steamships that call regularly at this port are shown in the table on page 85. It will be observed that the larger trans-Atlantic lines have their terminals on the Hudson River, the concentration being especially marked between Little West Twelfth Street and West Twenty-fifth Street on the New York side, where the Cunard Line, the Compagnie Generale Transatlantique, the Atlantic Trans-

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port Line, the White Star Line, the Red Star Line, the American Line, the Anchor Line, and the Hamburg-American Line (Atlas Service) have their docks.

On the New Jersey shore of the Hudson at Hoboken are located the important terminals of the Hamburg-American Line, the North German Lloyd, the Holland-America Line, and the Scandinavian-American Line.

The principal lines in the trade with the West Indies are located chiefly on the lower East River and at the terminals of the New York Dock Co.

The lines to South America are to be found chiefly at the piers of the New York Dock Co. in South Brooklyn, and lines to the Orient, at the piers of the New York Dock Co. and the Bush Terminal Co.

The coastwise steamship lines and the Sound steamers to New England ports, as well as the Hudson River boats, have their principal terminals on the Manhattan side of the Hudson River.

The terminals of the New York Dock Co. on the South Brooklyn water front are the headquarters for ships in the trade with the West Indies, Central America, and South America. Eleven lines that use the piers of the New York Dock Co. operate to the points named.

The Manhattan side of the East River is given over largely to freight-transfer terminals of the several railroads, but it will be observed that one trans-Atlantic line, the Compania Transatlantica, and three lines to the Caribbean Sea, the Munson Line, the New York & Cuba Mail Steamship Co., and the United Fruit Co., have terminals there.

The terminals of the Bush Terminal Co. are used largely by vessels engaged in the trade with South Africa, Australia, and the Far East. Of the 17 regular lines that use the Bush piers, 8 are engaged in that trade, 5 in the Central and South American trade, 2 in trade with Mediterranean ports, 1 with Norway, and 1 with Russia.

Details as to the length and width of the piers occupied by the several lines of steamships is given in the table on pages 103 to 110.

The general character of the terminals not included in the above table is given in the general description which precedes that table.

*Terminal companies.*—Reference has been made to the large tracts of water-front property held by dock and terminal companies not controlled by railroad interests. Probably at no port in the United States, except Galveston and Texas City, are companies of this character such important factors in port operations.

One of the most important terminal companies is the New York Dock Co. This company owns practically the entire South Brooklyn water front from a point immediately south of Brooklyn Bridge to Erie Basin, a distance of about 2½ miles. The property of this company includes 35 piers with a total area of 1,741,925 square feet and a shedded area of 1,425,892 square feet, more than 150 warehouses with a floor space of 5,746,937 square feet, two factory buildings with a floor area of 441,600 square feet, and grain elevators with a storage capacity of 2,025,000 bushels, in addition to three railroad terminals, car-float bridges, car floats, tugs, and lighters.

Some of the warehouses are six stories in height, while many have five stories. This company is said to have the largest bonded and free warehouse system in the Western Hemisphere. Seven of the warehouses, with a floor area of 322,874 square feet, are used for cold storage.

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In recent years the New York Dock Co. has followed the example of the Bush Terminal Co. in constructing loft buildings for manufacturing purposes. Two buildings 460 feet long, 80 feet wide, and six stories in height and of reinforced-concrete construction have been erected.

The New York Dock Co. controls by stock ownership the New York Dock Railway, which operates three freight terminals known as the Fulton, Baltic, and Atlantic, in connection with the piers and warehouses of the New York Dock Co. These terminals are provided with float bridges for transferring cars from floats to freight yards and with tracks leading to the warehouses and piers of the dock company.

Details as to the dimensions and occupants of the piers of the New York Dock Co. are shown in the table on page 109.

The Bush Terminal Co. is one of the newest terminals at the port of New York, and was the first to provide loft buildings for manufacturing purposes along with warehouse and pier facilities. This terminal was established in 1895 on what was then a remote and neglected section of the South Brooklyn water front.

The property of the Bush Terminal Co. covers 200 acres and includes seven modern piers with an area of 1,470,138 square feet, 130 warehouses, 10 loft buildings for manufacturing purposes, and a terminal railroad with 25 miles of track and yard space for 2,000 cars.

The piers owned by this company are among the longest in the port. One is 1,549 feet long, four are 1,337 feet in length, one is 1,315 feet, and one is 1,241 feet. The last-named pier is 270 feet wide, while each of the others is 150 feet in width.

Four of the factory buildings of this company are 600 feet long and 75 feet wide, while 14 are 700 feet long and 75 feet wide. All are six stories in height and of reinforced concrete construction.

The Brooklyn Eastern District Terminal was probably the first private terminal for public use in the port of New York. According to well-authenticated report, this terminal had its beginning in 1876.

This organization has three terminals. The main terminal is located on the East River in Brooklyn and includes the frontage between North Third and North Tenth Streets. Of the branch terminals one is on the Tidewater Basin in Jersey City and the other, known as the Queensboro Terminal, on the East River, between Thirteenth and Fourteenth Streets in Long Island City.

The main terminal of the Brooklyn Eastern District Terminal is adjacent to the large refineries of the American Sugar Refining Co. and to other important manufacturing concerns and occupies an area of about 740,000 square feet. This terminal has one large covered pier for steamship freight and six open piers, in addition to four car-float bridges.

The yard capacity of the main terminal is 1,500 cars and the equipment includes 10 locomotives, 13 car floats, 12 lighters, and 5 tugs. An interesting feature is the operation of the car floats on a regular schedule.

The main terminal has a hay-storage warehouse with a floor area of 37,250 square feet and two warehouses for the storage of flour and package freight, one being 450 feet long, 75 feet wide, and three stories high, while the other is 120 feet long. 75 feet wide, and four stories high. This terminal is equipped with coal pockets of 35,000 tons capacity and with three cranes, two of 10 tons and one of 20 tons capacity, for handling heavy freight.

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The Queensboro Terminal occupies a river frontage of 419 feet and has a long wharf and wharf shed. This terminal has only recently been established.

The Jersey City Terminal of this company is located at the foot of Warren Street on the Tidewater Basin of the Morris & Essex Canal. This terminal has direct connections with the various railroads having terminals on the New Jersey shore of New York Harbor, and has a freight yard with a capacity of 100 cars, car-float bridges, and warehouses for the storage of freight.

The Jay Street Terminal is the fourth of the private terminals on the Brooklyn water front. This terminal is operated by a partnership whose members are identified with the Arbuckle Bros. sugar refinery and coffee mills. This terminal, which was opened to the public in 1905, is located on the East River just north of the Brooklyn Bridge and occupies an area of about 200,000 square feet.

The property of the Jay Street Terminal includes six piers. Three of the piers, with a ground area of 66,788 square feet and a shedded area of 60,648 square feet, as well as several warehouses, with a total floor area of 440,800 square feet, were acquired from the New York Dock Co. in 1911. Two of the other piers are open, while one has a shed with an area of about 7,000 square feet.

The Jay Street Terminal is equipped with locomotives, lighters, and other equipment for the interchange of freight with the trunk-line railroads. It has a yard capacity of 250 cars and its equipment includes a gantry crane of 20 tons capacity for handling heavy machinery and other bulk freight.

The American Dock Co. is one of the oldest terminal companies at the port of New York and is located at Tompkinsville on Staten Island. The property of this company covers an area of about 30 acres, including grants of land under water and has a water frontage of 946 feet at the bulkhead line.

The terminals of this company include five piers with an area of 386,955 square feet, in addition to 30 warehouses with about 671,000 square feet of floor space. The terminals are served by tracks connecting with the Staten Island Rapid Transit Co. a subsidiary of the Baltimore & Ohio Railroad. No car floats are used at these terminals for the interchange of freight between railroad and vessel, since direct rail connection is made by means of a bridge over Arthur Kill connecting Staten Island with New Jersey.

Three of the piers of the American Dock Co. are leased to and operated by shipping agents, Piers 1 and 2 being controlled by Houlder, Weir & Boyd, and Piers 4 and 5 (one pier, in fact) by the Oriental Operating Co. Piers 3 and 6 are operated by the dock company.

**Type of wharf construction.**—The general type of wharf construction at the port of New York may be best described by the following extracts from a paper [a] on Types of American Public Wharf Construction prepared by W. J. Barney:

> This type of pier (the open pier) is composed of a wooden or concrete floor system resting upon a substructure of wooden piles arranged in rows or bents, the piles running up to the underside of the pier deck. * * * Perhaps the most distinctive feature has been the development of the concrete deck with asphalt wearing surface to replace the wooden deck and wearing surface ordinarily used elsewhere.

[a] Proceedings of the Third Annual Convention of the American Association of Port Authorities (Baltimore, Md., 1914), pp. 192-205.



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The new type of deck consists of reinforced concrete, laid directly on the transverse-cap system of the wooden-pier substructure. This concrete is laid in slabs, spanning the pile bents practically as simple beams. An asphalt wearing surface, needed to resist heavy team traffic, is laid directly on the concrete deck. This type of deck has been used where the bottom underlying the pier is such that no settlement could occur.

The New York water front has been improved under the pier-and-slip system so that the maximum wharfage could be realized from the shore front, the fairway being sufficiently wide for piers varying in length from 150 to 1,600 feet. The usual widths of these piers are 60, 75, 80, and 100 feet and generally correspond with the width of the street ends. This is due largely to the fact that formerly the street ends and land under water therefrom were owned by the city and the intervening shore fronts held by private owners. The longer piers, notably the Chelsea and the South Brooklyn piers, are 125 to 150 feet in width. The shore front for these improvements was purchased en bloc and the pier widths and intervening slips 250 feet and 275 feet wide, respectively, were selected to meet special conditions.

The New York open pier undoubtedly is admirably adapted to the natural conditions. Sewerage pollution of the waters in the North and East Rivers and the Upper Bay, practically permanent, has driven out wood borers so that the pile substructures are permanent below mean tide.

Over the pier sites the water varies from 15 to 40 feet in depth, generally too deep for an economical design of solid wharf or filled-in pier.

**Port administration.**—The port of New York is under the control of the municipality. The administrative authority is exercised through the department of docks and ferries. The head of this department is the commissioner of docks, who is appointed by the mayor and receives a salary of $7,500 a year. In addition there are two deputy commissioners, each receiving $5,000; a chief engineer, $10,000; a deputy chief engineer, $6,000; two mechanical engineers, $4,000 each; a superintendent of docks, $5,000; two assistant superintendents of docks, $2,500 each; and an assistant superintendent of ferries, $3,000.

The department of docks and ferries employs, as a rule, about 2,600 persons, including a large force of engineers, draftsmen, surveyors, clerks, auditors, inspectors, foremen, mechanics, artisans, ticket agents, dock hands, watchmen, etc.

For purposes of administration the staff of the department of docks and ferries is divided into a number of sections.

The department of docks and ferries has exclusive charge and control, subject in certain particulars to the commissioners of the sinking fund, of all the wharf property and ferries owned by the city of New York. The department is also empowered to regulate all wharf property that is privately owned within the city.

The commissioner of docks has the following powers:

A. Subject to the approval of the board of estimate and apportionment—

To prepare plans for terminal facilities and equipment thereof and to build or cause to be built the whole or any part thereof.

B. Subject to the approval of the commissioners of the sinking fund—

1. To prepare plans for terminal facilities and equipment thereof and to build or cause to be built the whole or any part thereof, subject to the board of estimate and apportionment.

2. To take title to wharf property in the name of the city after agreement with the owners, or, in case of failure to agree, to institute, with the consent of the board of estimate, condemnation proceedings for the acquisition of the same.

3. To adopt and execute general plans or change previously adopted plans for waterfront improvement.

4. To establish bulkhead and pierhead lines.

5. To regulate the use of marginal streets.

6. To establish new ferries and the leasing of franchises for ferry operation.

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C. Subject to no control—

1. To grant permits for the use of wharf property for periods not exceeding one year.
2. To make contracts for construction work, and for furnishing material and supplies to the value of not more than $1,000.
3. To direct private owners to dredge or deepen slips alongside of and adjoining their wharves, slips, or bulkheads, and in default thereof to cause the same to be done and the cost to be assessed on the property.
4. To set aside piers for recreation purposes.
5. To build sheds for the protection of property belonging to the city and to grant permits for lessees or private owners to erect sheds on their property subject to the regulations of the commissioner of docks.
6. To make rules and regulations and give such directions as will secure dispatch in loading and unloading vessels and the prompt removal of the vessels from the wharf property as soon as the loading or unloading is completed; also such rules and regulations as shall be needed to prevent any unnecessary accumulation of freight or merchandise while any vessel is receiving or discharging cargo.
7. To order the removal of any ship or vessel from any portion of the water front which it is not entitled to occupy.
8. To regulate wharfage and dockage rates on property improved under the new plan.
9. To designate berths for public baths, upon request of the borough president.
10. To set aside water front for other city departments.

The city can acquire property for water-front improvement by condemnation proceedings as well as by purchase.

Leases of wharf property belonging to the city can be made for periods not exceeding 10 years, with covenant for renewal or renewals at advance rents for terms of 10 years each but for an aggregate period not to exceed 50 years. The intention to lease city wharf property must be duly advertised in the city Record and the daily newspapers for at least 10 days and the lease must be given to the highest bidder; otherwise, the commissioner can make no lease without the approval of the commissioners of the sinking fund. The form of lease contains, as a rule, the following provisions:

1. Lessee to collect wharfage.
2. Lessee to make all repairs.
3. Lessee to do all dredging.
4. In case of destruction by fire, floating ice, collision, or action of the elements lessee to rebuild.
5. Lessee responsible for all accidents on the premises.
6. Lessee not allowed to sublet without the consent of the commissioner of docks.
7. In cases where the improvement has not been completed by the building of the exterior granite wall and the widening of the marginal street, the lease contains clauses providing for the cancellation of the lease by the commissioner of docks for the purpose of proceeding with the said improvement.

The revenues of the department, consisting of rentals for piers, pier concessions, receipts from operation of municipal ferries, wharfage dues, etc., are turned into the general treasury of the city and used for general municipal purposes. No attempt is made to keep the revenues of the department in a separate and distinct fund for the use of the department alone.

Annual appropriations for the maintenance of the water-front property of the city and for the expenses of the department of docks and ferries are made by the board of estimate and apportionment from the general funds of the city that are raised by taxation and from revenues. Funds for new construction are provided by the sale of corporate stock, which is merely another name for municipal bonds.

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**Port charges.**—*Pilotage.*—The following are the rates of pilotage per foot draft, through New York Bay, the principal entrance to the port, as established by act of the legislature, passed April 3, 1884:

| Draft of vessels. | Inward. | Outward. |
|---|---|---|
| 6 feet to 13.5 feet | $2.78 | $2.02 |
| 14 feet to 17.5 feet | 3.38 | 2.33 |
| 18 feet to 20.5 feet | 4.13 | 3.08 |
| 21 feet and over | 4.88 | 3.56 |

The above rates apply only from April 1 to November 1. During the period from November 1 to April 1 a charge of $4 is added to each rate of pilotage.

The corresponding charges for pilotage through Hell Gate are as follows:

| Class of vessels. | Inside pilotage (City Island). | Outside pilotage (Sands Point). |
|---|---|---|
| Sloops and schooners | $1.00 | $1.50 |
| Brigs and staysail and topsail schooners | 1.25 | 1.75 |
| Barks, ships, and steamers | 1.25 | 1.75 |

An additional charge of $2 for ships, barks, or brigs and of $1 for schooners or sloops may be made during the winter months—that is, from November 1 to April 1.

*Towage.*—The average charge for assisting vessels into dock is about $20 for two tugs, which are necessary under usual conditions.

*Harbor dues.*—There are no harbor dues at New York Harbor.

*Dockage.*—Most of the steamship lines serving the port of New York lease piers under long-term leases either from the city or from the private dock and terminal companies. A few of the municipal piers are not leased and are open for the use of the public. Vessels using uncovered piers pay a dockage charge of 2 cents per day per net register ton up to 200 tons and one-half cent per ton for any excess over 200 tons, while vessels using a covered pier pay a flat rate of 1¼ cents per register ton. If the vessel occupies an outside berth and is not working cargo or ballast, one-half of this rate is charged.

Special dockage rates are made for Hudson River barges, market boats and barges, and schooners employed exclusively upon the rivers and waters of the State of New York, for canal boats, for clam and oyster boats, for lighters and barges, and for coal hoists on scows or floats.[a] Tramp vessels are generally charged $60 to $75 per day for berths at privately-owned piers.

*Wharfage.*—At the privately-owned terminals, as well as at those owned by the city, no charge is made against commodities handled over the wharves.

[a] Pamphlet on Wharfage Rates and Dock Masters' Districts, issued by R. A. C. Smith, commissioner of docks and ferries, 1914.

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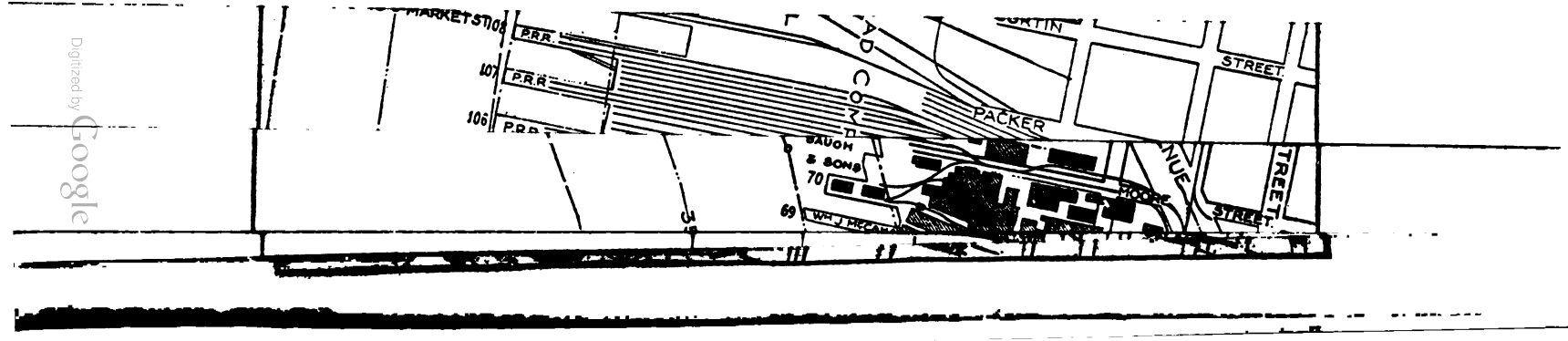


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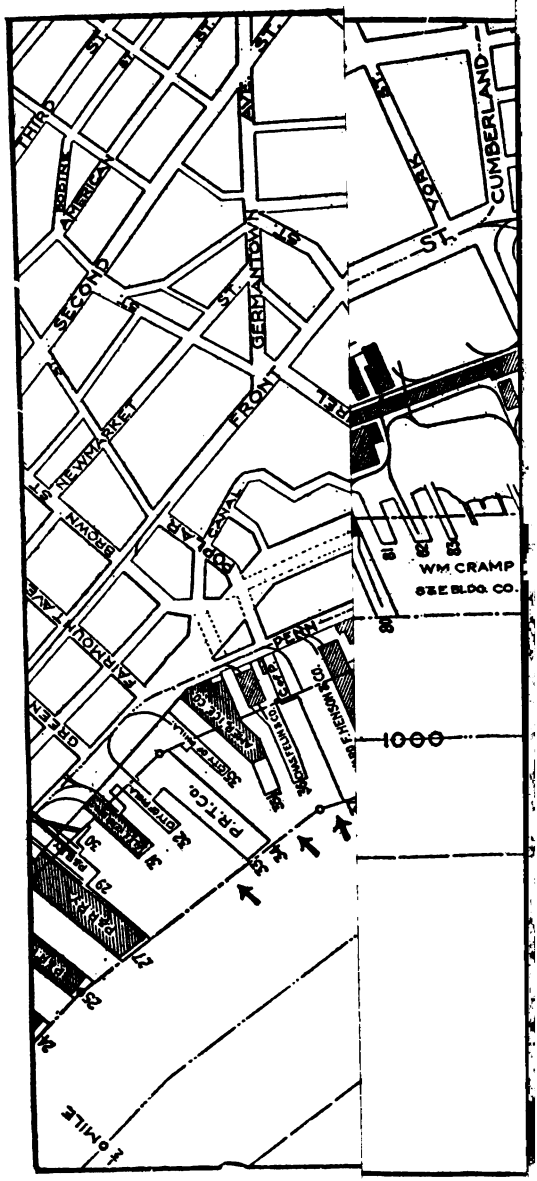


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## PHILADELPHIA, PA.

The city of Philadelphia is located on the Delaware River about 105 miles above Delaware Bay and about 30 miles below the city of Trenton, N. J., which is the present head of navigation for the river. The Schuylkill River flows through the city and empties into the Delaware at the southerly limit of the city.

Before improvement the Delaware River was available for ocean-going vessels of medium draft only, the shoalest portion having a depth of 17 feet at mean low water. The first permanent and systematic improvement of the river was not begun until 1885, when a project for a 26-foot channel was approved. Later a project for a 30-foot channel was adopted and a channel of that depth was completed. Work is now in progress on a channel 35 feet deep at mean low water, 800 feet wide in the straight parts, 1,200 feet wide at Bulkhead Bar, and 1,000 feet wide at other bends, together with dikes to control the tidal flow.[a]

Much of the work on the present project has been completed, but the maximum draft that could be carried on June 30, 1914, over the shoalest portion of the river below the city was 30 feet at mean low water. Vessels drawing 40 feet of water can be carried from the ocean to a point in Delaware Bay less than 8 miles below the mouth of the river. The mean range of tide is 6 feet at Philadelphia and in Delaware Bay.[b]

From Allegheny Avenue in the city of Philadelphia north to the city of Trenton the Delaware River has been improved by a channel having a width of 200 feet and a nominal depth of 12 feet at mean low water. The greatest draft that could be carried on June 30, 1914, over the shoalest part (Mud Island) of this section of the river was 11 feet at mean low water. The mean range of tide is 5.3 feet at Philadelphia and 4.2 at Trenton.[c]

The Schuylkill River is navigable for large vessels for a distance of about 6½ miles above its mouth—that is, to Chestnut Street Bridge—and for barges for seven-eighths of a mile farther, to Fairmount Dam. "The river is narrow and crooked, and for a distance of about 4½ miles above its mouth leads through low marshes on either side. * * * Between its mouth and Walnut Street Bridge the river is crossed by six drawbridges."[d]

The average width of the Schuylkill between bulkheads is from 500 to 600 feet. A channel 200 feet wide is now being dredged by the city of Philadelphia. The channel will have a depth of 30 feet from its mouth to Passyunk Avenue, 26 feet from this point to Grays Ferry Bridge, and 20 feet from that bridge to Walnut Street.[e]

The city has been authorized by an act of the legislature passed in 1913 to construct, when funds are made available by proper appropriation, bulkheads in front of any property on either the Delaware or the Schuylkill River, where such bulkheads are considered necessary or desirable for the improvement or preservation of the channels. The law provides, however, that when the owner of water front im-

[a] Report, Chief of Engineers, U. S. Army, 1914, p. 306.
[b] Idem, p. 309.
[c] Idem, p. 305.
[d] Coast Pilot, Atlantic Coast, Part V, p. 85.
[e] Report, Department of Wharves, Docks, and Ferries, City of Philadelphia, 1913, p. 30.

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proved in this manner, shall make practical use of the property and the bulkhead, he shall reimburse the city to the extent of the cost of the bulkhead.

Under the power conferred by this act the city has already bulkheaded large sections of the frontage on both rivers. The plan is to bulkhead the Schuylkill for its entire length within city limits.

**Railroads.**—Philadelphia is served by the Baltimore & Ohio, the Pennsylvania, and the Philadelphia & Reading Railroads.

The wharves on the Delaware River are served directly in most instances by the Philadelphia Belt Line Railroad, which connects with the tracks of the above-named railroads. This railroad is operated by the Pennsylvania and the Philadelphia & Reading Railroads by agreement with and under the direction of the belt-line company, the operating expenses being divided pro rata among the several railroads. A certain degree of public control is assured by the fact that 51 per cent of the voting stock of the belt-line company is vested in the commercial organizations of the city.

The belt line is operated over 6.68 miles of track located in the busiest section of the harbor. Cars wanted for sidings along the belt line are ordered through the belt-line company from the trunk-line railroads. No switching charge is made to shippers, but a book charge of $3 to $4 per car is made against the railroad over whose line the car is received or delivered by the belt line. This charge is used merely for the purpose of determining the distribution of the operating expenses of the belt line among the three trunk-line companies.

**Steamship lines.**—The following is a list of the principal trans-Atlantic and coastwise lines that call regularly[a] at the port of Philadelphia, together with the number and location of piers or wharves, and the frequency of sailings:[b]

| Lines. | Piers. | Outbound service to— | Inbound service from— | Sailings. |
|---|---|---|---|---|
| Allan Line | 24 North | Glasgow | Glasgow, Liverpool, St. Johns (Newfoundland), Halifax. | Semimonthly. |
| America-Levant Line | 34 South | Smyrna, Alexandria | Smyrna, Alexandria | Monthly. |
| American and Indian Line. | 34-36 South | | Bombay, Calcutta | Do. |
| American-Hawaiian Line. | 60, 61 South | | Hawaiian Islands and Pacific coast ports via Panama Canal. | Do. |
| American Line | 53 South | Liverpool, Queenstown | Liverpool, Queenstown | Weekly. |
| Atlantic Fruit Co | 3 South | Jamaica and other points. | Jamaica and other points. | Do. |
| Atlantic Transport Line. | 46, 48, 55 South | London | London | Semimonthly. |
| Austro-Americana Line. | 16 South | Trieste, Fiume | Trieste, Fiume | Do. |
| Bombay-American Line. | Girard Point | | Bombay | Monthly. |
| Clay Line | 27 North | | Fowey | Semimonthly. |
| Clyde Line | 1, 2, and 3 North | Norfolk, Newport News, New York. | Norfolk, Newport News, New York. | Biweekly. |
| Cuneo Importing Co | 10 North | Jamaica | Jamaica | Weekly. |
| Furness Line | Port Richmond, 27 North. | Leith, Middlesboro | Leith, Middlesboro | Semimonthly. |
| Great Northern Paper Co. | 19 North | Stockton Springs, Me. | Stockton Springs, Me. | Monthly. |
| Hamburg-American Line. | 46, 48 South | Hamburg | Hamburg | Bimonthly. |

[a] Except as interrupted by the European war

[b] Report Department of Wharves, Docks, and Ferries, city of Philadelphia, 1914, pp. 111-112.

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| Lines. | Piers. | Outbound service to— | Inbound service from— | Sailings. |
|---|---|---|---|---|
| Hansa Line | 46 South | | Calcutta | Monthly. |
| Holland-America Line | 48 South | Rotterdam | Rotterdam | Every 3 weeks. |
| Italia Line | 19 North | Naples, Genoa | Naples, Genoa | Do. |
| Luckenbach Steamship Co. | 56, 57 South | San Francisco and Pacific coast ports via Panama Canal. | San Francisco and Pacific coast ports via Panama Canal. | Every 10 days. |
| Manchester Line | Pier D | Manchester | Manchester, St. John (New Brunswick). | Bimonthly. |
| Merchants & Miners' Transportation Co. | 18 to 24 South | Jacksonville, Savannah, Boston. | Jacksonville, Savannah, Boston. | Semiweekly. |
| Munson Line | | Irregular service | Irregular service | Tramp. |
| North German Lloyd Steamship Co. | 34 South | | Bremen | Semimonthly. |
| Philadelphia Transatlantic Line. | 25 North; Pier A. | London | London | Biweekly. |
| Philadelphia-New Orleans Transportation Co. | 19 North | New Orleans, Charleston. | New Orleans, Charleston. | Weekly. |
| Red Star Line | 55 South | Antwerp, Dover | Antwerp | Biweekly. |
| Scandinavian - American Line. | 27 North | Christiana, Copenhagen | Christiana, Copenhagen | Monthly. |
| Sota and Aznar | Girard Point | | Spanish points | Occasionally. |
| Southern Steamship Co. | 46 South | Tampa, Key West, Jacksonville, Charleston. | Tampa, Key West, Jacksonville, Charleston. | Biweekly. |
| Sweden & Norway Steamship Line. | 27 North and Pier C. | Christiania, Goteborg. | Christiania, Goteborg. | Monthly. |
| United Fruit Co | 5 North | Jamaica, West India ports. | Jamaica, West India ports. | Biweekly. |

The following is a list of the local lines operating between Philadelphia and near-by cities and towns:[a]

| Lines. | Piers. | Locations. | Service between Philadelphia and— | Sailings. |
|---|---|---|---|---|
| Augustine Amusement Co. | 4 North | Arch Street | Augustine Park | 3 times a week. |
| Bush Line | 10 North | Race Street | Marcus Hook, Wilmington, New Castle. | Daily. |
| Chester Shipping Co | 4 North | Arch Street | Chester and intermediate points. | Do. |
| Delaware River Transportation Co. | 5 South | Chestnut Street | Burlington, Bristol, Trenton, and intermediate points. | Do. |
| Dover & Philadelphia Navigation Co. | 5 North | Above Arch Street. | Bowers Beach, Lebanon, Dover. | 3 times a week. |
| Ericsson Line | 3 South | Chestnut Street | Chester, Delaware City, Baltimore. | Daily. |
| Frederica & Philadelphia Navigation Co. | do | do | Bowers Beach, Frederica. | 3 times a week. |
| Milford & Philadelphia Transportation Co. | 3 South | Chestnut Street | Milford and intermediate points. | Daily. |
| Odessa Steamboat Co | 4 North | Arch Street | Fort Mott, Port Penn, Middleton, Odessa. | Twice a week. |
| Philadelphia, Ranecccas & Mt. Holly Transportation Co. | do | do | Ranecccas, Mt. Holly, and intermediate points. | Daily. |
| Salem Freight Co | do | do | Billingsport, Pennsgrove, Pennsville, Salem. | Do. |
| Smyrna Steamboat Co | do | do | Smyrna and intermediate points. | Twice a week. |
| Trenton Transportation Co. | 10 North | Race Street | Trenton | Daily. |
| Wilmington Steamboat Co. | 5 South | Chestnut Street | Chester, Wilmington | Daily—4 in winter, 11 in summer. |
| Woodland Steamboat Co. | 4 North | Arch Street | Chester, Pennsgrove, Augustine Park, Woodland Beach. | Sundays until July 4, then daily until Labor Day. |

[a] Report Department of Wharves, Docks, and Ferries, city of Philadelphia, 1914, p. 114.

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In addition to the above-mentioned lines, the following lines of oil steamers operate on regular schedules:

| Lines. | Locations. | Outbound service to— | Inbound service from— | Sailings. |
|---|---|---|---|---|
| Atlantic Refining Co. | Point Breeze, Schuylkill River. | English and other European ports. | Sabine and Port Arthur, Tex. | Biweekly. |
| Gulf Refining Co... | Gibsons Point, Schuylkill River. | ..... | Port Arthur, Tex..... | Do. |
| Pure Oil Co..... | Marcus Hook, Delaware River. | New York..... | ..... | Do. |
| Sun Co..... | .....do..... | English and other European ports. | Sabine, Tex..... | Do. |
| Texas Co..... | .....do..... | ..... | Port Arthur, Tex..... | Do. |

**Commerce of the port.**—Statistics compiled by the United States Army engineer in charge of the Philadelphia district show that the commerce of the port of Philadelphia amounted to 26,569,352 short tons, valued at $1,229,454,962, in the calendar year 1913, which was more nearly a normal year than 1914, and is, therefore, preferable for purposes of discussion. In these totals 4,535,134 short tons of freight carried on car floats between Philadelphia and Camden are included.

*Foreign trade.*—The foreign trade of the port in 1913 consisted of 6,054,058 short tons valued at $164,184,357, while the coastwise and local trade was 20,515,294 short tons, valued at $1,065,270,605.

The following table shows the quantity and value of the principal commodities in the imports and exports in the foreign trade of this port in the calendar years 1913 and 1914[a]:

| Commodities. | Short tons. | | Value. | |
|---|---|---|---|---|
| | 1913 | 1914 | 1913 | 1914 |
| IMPORTS. | | | | |
| Hides and skins | 30,981 | 23,549 | $13,567,190 | $11,607,651 |
| Sugar | 222,530 | 310,591 | 9,037,896 | 12,565,090 |
| Ores | 1,830,903 | 1,085,612 | 7,012,368 | 3,727,234 |
| Drugs and chemicals | 52,923 | 30,630 | 6,071,988 | 4,095,332 |
| Wool | 13,215 | 15,231 | 4,507,534 | 6,262,641 |
| Iron and steel, and manufactures of | 65,890 | 54,305 | 4,664,577 | 3,108,227 |
| Burlap | 17,838 | 11,802 | 3,532,801 | 2,308,770 |
| Groceries, provisions, etc | 14,676 | 9,277 | 2,432,562 | 1,899,859 |
| Nitrate of soda | 66,845 | 57,753 | 2,351,209 | 1,724,563 |
| Wood pulp | 51,133 | 42,236 | 1,701,389 | 1,740,193 |
| Cotton manufactures | 3,317 | 974 | 1,753,761 | 982,424 |
| Bananas | 43,670 | 47,387 | 1,173,518 | 1,432,040 |
| Magnesite | 123,307 | 87,209 | 1,165,761 | 682,772 |
| Tin | 1,655 | 1,152 | 1,094,053 | 831,842 |
| Palm oil | 7,005 | 7,599 | 1,001,370 | 986,721 |
| All other imports | 708,872 | 677,168 | 30,879,413 | 33,997,414 |
| Total imports | 3,254,760 | 2,462,775 | 91,947,390 | 87,952,773 |
| EXPORTS. | | | | |
| Oil, mineral, etc.: | | | | |
| Illuminating | 745,167 | 459,030 | 13,890,288 | 8,973,151 |
| Lubricating | 140,060 | 99,862 | 5,243,542 | 3,643,919 |
| Naphtha | 74,923 | 78,923 | 3,348,437 | 2,786,555 |
| Residuum | 65,474 | 60,466 | 734,767 | 846,244 |
| All other | 1,773 | 639 | 342,966 | 157,766 |
| Total | 1,027,397 | 698,920 | 23,560,000 | 16,407,635 |
| Wheat | 214,931 | 335,838 | 6,836,325 | 12,625,196 |
| Wheat flour | 114,880 | 106,061 | 6,123,990 | 5,781,743 |
| Iron and steel, and manufactures of | 76,966 | 38,105 | 3,986,690 | 3,291,723 |
| Cotton | 15,925 | 14,676 | 3,295,637 | 2,963,803 |
| Coal | 978,626 | 785,730 | 2,996,837 | 2,123,216 |
| Lard, etc | 10,052 | 9,203 | 2,174,900 | 2,042,690 |
| Leather | 2,723 | 2,270 | 1,890,923 | 2,279,337 |
| Wood, and manufactures of | 49,600 | 35,025 | 1,631,509 | 1,190,850 |
| Oleo | 5,886 | 3,310 | 1,178,193 | 629,839 |
| Paraffin | 17,152 | 7,805 | 1,154,376 | 473,303 |
| All other exports | 242,795 | 212,690 | 10,445,984 | 16,447,476 |
| Total exports | 2,799,298 | 2,249,633 | 72,236,967 | 66,256,811 |

[a] Report, Chief of Engineers, U. S. Army, 1914, p. 1818; idem, 1915, p. 2207.

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*Coastwise and domestic trade.*—Details of the coastwise and domestic trade that passed over the Delaware River [a] between the city and the ocean in 1913 and 1914 are shown in the following table:

| Commodities. | Short tons. | | Value. | |
|---|---|---|---|---|
| | 1913 | 1914 | 1913 | 1914 |
| General merchandise | 4,065,193 | 3,844,396 | $684,556,200 | $512,481,510 |
| Coal and coke | 7,829,006 | 7,692,689 | 28,908,471 | 26,802,151 |
| Petroleum, gasoline, etc. | 1,174,877 | 1,176,020 | 20,047,915 | 23,148,588 |
| Wool | 33,746 | 26,520 | 16,843,000 | 12,994,800 |
| Sugar | 187,955 | 257,066 | 13,373,689 | 20,058,190 |
| Cotton piece goods | 18,000 | 14,400 | 10,300,000 | 3,500,000 |
| Iron and steel, and manufactures of | 165,545 | 203,329 | 8,281,749 | 10,606,515 |
| Skins | 8,000 | 8,576 | 7,850,000 | 8,404,480 |
| Lumber | 421,346 | 413,611 | 6,834,481 | 6,498,171 |
| Raw cotton | 25,472 | 12,130 | 5,094,400 | 2,426,000 |
| Produce and fruits | 121,224 | 128,156 | 4,848,960 | 5,298,289 |
| Chemicals | 288,898 | 243,859 | 4,666,178 | 3,203,217 |
| Fertilizers | 278,299 | 215,681 | 4,525,384 | 2,910,684 |
| Powder and other explosives | 13,649 | 11,742 | 3,020,180 | 2,645,940 |
| Grains | 88,531 | 51,098 | 2,376,480 | 1,236,090 |
| Canned goods | 41,296 | 49,380 | 2,161,466 | 2,532,788 |
| Leather | 1,467 | 8,486 | 1,760,400 | 3,624,160 |
| Railroad ties | 142,485 | 146,371 | 1,400,850 | 1,475,810 |
| Groceries and foodstuffs | 16,986 | 19,477 | 1,374,300 | 2,029,760 |
| Turpentine and rosin | 20,207 | 18,285 | 1,203,678 | 1,176,640 |
| All other | 3,693,591 | 3,851,901 | 226,838,383 | 204,711,552 |
| Total | 18,645,773 | 18,393,273 | 1,056,356,164 | 867,765,335 |

The foregoing figures do not include the shipping on the Delaware River between Philadelphia and Trenton. This traffic amounted in 1913 to 1,869,521 short tons, valued at $8,914,441. Sand, gravel, and stone formed more than three-fourths of the total tonnage and coal more than one-eighth. From the standpoint of value, the most important commodities were as follows: General merchandise, $3,113,340; miscellaneous, $2,039,760; iron pipe and specials, $1,095,809; coal, $940,333; and pig iron, $656,288.[b]

**Extent and ownership of water front.**—The total length of direct [c] water front at the port of Philadelphia is 196,469 feet (37.21 miles). Of this frontage, 89,159 feet (16.89 miles) are in actual use and the remainder, 107,310 feet (20.32 miles), can be economically developed. The city of Philadelphia owns 25,568 feet; the United States, 23,549 feet; and private interests, 147,352 feet. Of the privately-owned frontage, 39,007 feet are held by railroad companies; 34,971 feet, by industrial companies; 667 feet, by steamship companies; and 72,907 feet, by other private owners.

Of the 49,117 feet of frontage owned by the city of Philadelphia and the United States, 2,985 feet are leased to industrial concerns; 1,326 feet, to steamship lines; 745 feet, to railroad companies; and 183 feet, to wharf and dock companies. The balance is held chiefly for city piers and parks and for the United States Navy Yard at League Island. The director of the department of wharves, docks, and ferries of Philadelphia also reports that the total usable berthing space in the port at the present time (July, 1915) is 162,500 feet, of which 35,000 feet are available for deep-draft vessels. Of the total berthage space, 18,115 feet are publicly owned, about 7,000 feet being available for vessels of deep draft.

[a] Does not include trade on the section of Delaware River to the north of Philadelphia.
[b] Report, Chief of Engineers, U. S. Army, 1914, p. 1804.
[c] Measured along harbor and shore lines; does not include length of piers.

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**Terminals.**—The following table shows the principal piers and ferry slips on the Delaware and Schuylkill Rivers, together with the location, names of occupants and of owners, and dimensions of each pier:

| Piers and slips. | Length. | Width. | Occupants. | Owners. |
|---|---|---|---|---|
| DELAWARE RIVER, SOUTH OF MARKET STREET. | *Feet.* | *Feet.* | | |
| Pier 1 | 149 | 66 | Porter, Gildersleeve Co. | Provident Life & Trust Co. |
| Pier 3 | 560 | 80 | Atlantic Fruit Co.; Ericsson Line; Frederica & Philadelphia Navigation Co.; Philadelphia, Rancocas & Mt. Holly Transportation Co. | Baltimore & Philadelphia Steamboat Co. |
| Pier 5 | 555 | 80 | Various local lines a | City. |
| Ferry slips (2) | | | Philadelphia & Reading Ry. Co. | Delaware River Ferry Co. of New Jersey. |
| Pier 8 | 562 | 94 | do | Philadelphia & Reading Ry. Co. |
| Pier 9 | 224 | 58 | do | Do. |
| Bulkhead | 50 | | | City. |
| Piers 10–11 | 568 | 185 | Pennsylvania R. R. Co. | Pennsylvania R. R. Co. |
| Pier 14 | 576 | 120 | do | Do. |
| Pier 16 | 582 | 120 | Austro-Americana Line | City. |
| Piers 18–20 | 602 and 580 | 304 | Merchants & Miners' Transportation Co. | Merchants & Miners' Transportation Co. |
| Pier 22 | 570 | 134 | do | Schuylkill River East Side R. R. Co. |
| Bulkhead | 10 | | | City. |
| Pier 24 | 554 | 94 | Merchants & Miners' Transportation Co. | Schuylkill River East Side R. R. Co. |
| Bulkhead | 83 | | | Philadelphia & Reading Ry. Co. |
| Ferry slip | | | Philadelphia & Reading Ry. Co. | Do. |
| Do | | | Gloucester Ferry Co. | City. |
| Pier 28 | 543 | 78 | Southern Steamship Co. | Franklin Sugar Refining Co. |
| Pier 30 | 183 | 49 | do | Do. |
| Pier 32 | 126 | 46 | Franklin Sugar Refining Co. | Do. |
| Pier 34 | 554 | 100 | American & Indian Line; America-Levant Line; North German Lloyd Steamship Co. | Philadelphia & Reading Co. |
| Pier 35 | 222 | 50 | Independent Pier Co. | Do. |
| Bulkhead | 50 | | | City. |
| Pier 36 | 280 | 180 | Philadelphia & Reading Ry. Co. | Philadelphia & Reading Co. |
| Pier 38 | 551 and 552 | 180 | Open pier for general wharfage. | City. |
| Pier 40 | 551 and 552 | 180 | do | Do. |
| Pier 46 | 624 and 645 | 102 | Atlantic Transport Line; Hamburg-American Line; Hansa Line; Southern Steamship Co. | Pennsylvania R. R. Co. |
| Pier 48 | 686 | 102 | Atlantic Transport Line; Hamburg-American Line; Holland-America Line. | Do. |
| Pier 49 | 125 | 60 | Pennsylvania R. R. Co. | City. |
| Pier 53 | 700 | 152 | American Line | Pennsylvania R. R. Co. |
| Pier 55 | 649 and 500 | 152 | Atlantic Transport Line; Red Star Line. | Do. |
| Pier 56 | 380 and 398 | 81 | Luckenbach Steamship Co. | Do. |
| Pier 57 | 460 and 485 | 102 | Pennsylvania R. R. Co. | Do. |
| Pier 59 | 460 and 520 | 80 | do | Spreckles Sugar Refining Co. |
| Pier 60 | 560 and 515 | 80 | American-Hawaiian Steamship Co. | Do. |
| Pier 61 | 560 and 630 | 75 | do | Do. |
| Pier 62 | 638 and 410 | 55 | Baltimore & Ohio R. R. Co. | Baltimore & Ohio R. R. Co. |
| Pier 63 | 460 and 641 | 60 and 37 | do | Do. |
| Pier 64 | 290 and 280 | 60 | G. W. Edmonds & Co. | Philadelphia & Reading Ry. Co. |
| Pier 67 | 501 and 445 | 61 | W. J. McCahan Sugar Refining Co. | McCahan Sugar Refining Co. |
| Pier 68 | 465 and 511 | 44 | do | Do. |
| Pier 69 | 510 and 460 | 46 | do | Do. |
| Pier 70 | 352 and 200 | 90 | Baugh & Sons | Baugh & Sons. |
| Pier 72 | 450 and 420 | 46 | do | Do. |

a Including Delaware River Transportation Co. and Wilmington Steamboat Co.

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| Piers and slips. | Length. | Width. | Occupants. | Owners. |
|---|---|---|---|---|
| DELAWARE RIVER, SOUTH OF MARKET STREET—con. | *Feet.* | *Feet.* | | |
| Pier 73 [a] | 530 | 20 | Philadelphia Ship Repairing Co. | Philadelphia Ship Repairing Co. |
| Pier 73 [a] | 510 | 20 | .....do..... | Do. |
| Pier 74 | 503 and 514 | 20 | .....do..... | S. B. Morris estate. |
| Pier 78 [b] | 900 | 250 | (b)..... | City. |
| Pier 80 [c] | ..... | ..... | (c)..... | Baltimore & Ohio R. R. Co. |
| Pier 81 | 578 and 570 | 42 | Baltimore & Ohio R. R. Co. | Do. |
| Pier 82 | 590 and 603 | 41 | William Cramp Ship & Engine Building Co. | William Cramp Ship & Engine Building Co. |
| Pier 92 | 525 and 398 | 73 | Pennsylvania Salt Manufacturing Co. | Pennsylvania Salt Manufacturing Co. |
| Pier 93 | 415 and 445 | 94 | .....do..... | Do. |
| Pier 94 [d] | 368 and 380 | 78 | (d)..... | Greenwich Land Improvement Co. |
| Pier 103 | 262 and 250 | 40 | General Manufacturing Co .. | Adam W. South. |
| Pier 104 | 250 and 320 | 60 | American Agricultural Chemical Co. | Do. |
| Pier 105 | 327 and 483 | 61 | .....do..... | Union Fertilizer Co. |
| Pier 106 | 500 | 100 | Pennsylvania R. R. Co..... | Pennsylvania R. R. Co. |
| Pier 107 | 500 | 60 | .....do..... | Do. |
| Pier 108 | 500 and 800 | 60 | .....do..... | Do. |
| Pier 109 | 800 and 650 | 62 | .....do..... | Do. |
| Pier 110 | 652 and 650 | 65 | .....do..... | Do. |
| Pier 111 | 735 | 60 | .....do..... | Do. |
| Point House Wharf | 470 and 494 | 220 | Various lumber companies.. | Do. |
| SCHUYLKILL RIVER, GRAND POINT. | | | | |
| Pier 1 [a] | 1,050 | 50 | Pennsylvania R. R. Co. and general wharfage. | Do. |
| Pier 2 | 950 | 255 | .....do..... | Do. |
| Pier 3 | 860 | 50 | .....do..... | Do. |
| Elevator B Pier | 380 | 105 | .....do..... | Do. |
| DELAWARE RIVER, NORTH OF MARKET STREET. | | | | |
| Ferry slip | ..... | ..... | West Jersey Ferry Co..... | West Jersey Ferry Co. |
| Do | ..... | ..... | City..... | City. |
| Do | ..... | ..... | Camden & Philadelphia Ferry Co. | Camden & Philadelphia Ferry Co. |
| Do | ..... | ..... | ..... | ..... |
| Pier 1 | 556 | 100 | Clyde Line..... | Girard Estate. |
| Pier 2 | 545 | 83 | .....do..... | Do. |
| Pier 3 | 440 and 542 | 88 | .....do..... | Estate of Thomas Clyde. |
| Pier 4 | 530 | 80 | Various local lines..... | City. |
| Pier 5 | 540 | 71 | United Fruit Co..... | United Fruit Co. |
| Pier 8 | 162 | 87 | Wilmington & Philadelphia Line. | Lehigh Valley R. R. Co. |
| Pier 10 | 539 | 80 | Bush Line; Trenton Transportation Co.; Warner Line; West Indies Importing Co. Line. | City. |
| Pier 11 | 540 | 59 | Baltimore & Ohio R. R. Co. | Do. |
| Pier 12 | 540 | 71 | .....do..... | Pennsylvania Co. for Insurance of Lives. |
| Pier 13-14 | 305 | 233 and 238 | Pennsylvania R. R. Co..... | Pennsylvania R. R. Co. and Jayne Estate. |
| Ferry slip | ..... | ..... | Cooper Point & Philadelphia Ferry Co. | City. |
| Pier 19 | 571 | 166 | Great Northern Paper Co.; Italia Line; Lloyd Sabaudo Line; Philadelphia & New Orleans Transportation Co. | Do. |
| Pier 24 | 570 | 150 | Allen Line..... | Philadelphia & Reading Ry. Co. |
| Pier 25 | 501 and 490 | 102 | Philadelphia Transatlantic Line. | Do. |
| Pier 27 | 528 and 334 | 150 | Clay Line; Furness Line; Scandinavian-American Line; Sweden & Norway Steamship Co. | Do. |
| Pier 29 [e] | 128 | 77 | Philadelphia & Reading Ry. Co. | Do. |
| Pier 30 [e] | 124 and 155 | ..... | [f]..... | Do. |
| Pier 31 | 205 and 400 | 80 and 205 | Terminal Warehouse Co..... | George H. Kyd. |

[a] Half pier.
[b] Under construction.
[c] Destroyed by fire, October, 1912.
[d] In dilapidated condition.
[e] Bulkhead only.
[f] Not in use.

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| Piers and slips. | Length. | Width. | Occupants. | Owners. |
|---|---|---|---|---|
| DELAWARE RIVER, NORTH OF MARKET STREET—con. | *Feet.* | *Feet.* | | |
| Pier 32 | 310 and 180 | 51 | George W. Kugler & Son | City. |
| Pier 33-34 | 623 and 463 | 120 | Philadelphia Rapid Transit Co. | Philadelphia Rapid Transit Co. |
| Pier 35 | 181 and 405 | 45 | Caenwath, Bell & Co | City. |
| Pier 35½ | 510 and 574 | 102,99,and 68 | American Ice Co | Estate of Thomas H. Powers. |
| Bulkhead | 40 | | | City. |
| Pier 36 | 578 and 389 | 95 and 68 | Pierson Bros | Estate of Thomas H. Powers. |
| Pier 37-38 | 493 and 524 | 240 | Edward F. Henson & Co. (lumber). | Edward F. Henson & Co. |
| Pier 39 | 219 and 102 | 48 | Clayton W. Nichols | C. W. Nichols. |
| Pier 40 | 446 and 472 | 64 | Baltimore & Ohio R. R. Co. | Terminal Land Co. |
| Pier 41 | 150 and 192 | 37 | Rapid Transit Co | Electric Traction Co. |
| Pier 42-43 | 530 and 437 | 132 | Charles F. Felin & Co | Philadelphia & Reading Ry. Co. and estate of Wm. S. Taylor. |
| Pier 44 | 579 and 540 | 55 | Watson Malone & Son | E. B. Malone. |
| Pier 45 | 342 | 38 | J. W. Paxson & Co | J. W. Paxson Co. |
| Pier 46 | 383 and 557 | 73 | Pennsylvania Sugar Refining Co. | Pennsylvania Sugar Refining Co. |
| Pier 47 | 221 and 152 | 61 | George W. Gormley | G. W. Gormley. |
| Pier 48 | 335 | 56 and 38 | Pennsylvania R. R. Co | Pennsylvania R. R. Co. |
| Ferry slip | | | Kensington & New Jersey Ferry Co. | City. |
| Pier 49-50 | 628 and 533 | 160 | Pennsylvania R. R. Co | Pennsylvania R. R. Co. |
| Pier 51 | 303 and 293 | 40 and 42 | S. B. Vrooman & Co | S. B. Vrooman. |
| Pier 52 | 322 and 510 | 58 and 38 | J. W. Janney | J. W. Janney. |
| Pier 53 | 343 and 276 | 52 | Frank Merrihew & Son | Frank Merrihew. |
| Pier 54 | 176 and 145 | 93 | General Chemical Co | American Sheet & Tin Plate Co. |
| Pier 55 | 360 and 320 | 75 | American Ice Co | American Ice Co. |
| Pier 56 | 300 and 325 | 52 | Charles Lennig & Co | Estate of Charles Lennig. |
| Pier 57-58 | 1o2 | 158 | Recreation pier | City. |
| Pier 60 | 248 and 347 | 51 | Philadelphia Electric Co | Philadelphia Electric Co. |
| Pier 61 | 297 and 330 | 46 | do | Do. |
| Pier 62 | 282 and 277 | 84 | Kensington Ship Yard Co | Wm. Cramp Ship & Engine Building Co. |
| Pier 63 | 275 | 33 | do | Do. |
| Pier 64 | 190 | 54 | do | Kensington Ship Yard Co. |
| Pier 65 | 365 and 300 | 42 | do | Do. |
| Pier 66 | 141 and 251 | 190 | Hughes & Patterson | Hughes & Patterson. |
| Pier 67 | 449 and 452 | 65 | De Frain Sand Co | De Frain Sand Co. |
| Pier 69 | 469 and 392 | 81 | William M. Lloyd Co | William M. Lloyd Co. |
| Pier 70 [a] | 275 | 50 | Recreation purposes | City. |
| Pier 71 [a] | 288 | 152 | Seaman & Menough | R. J. & W. H. Hughes. |
| Pier 72 | 284 and 255 | 80 | De Frain Sand Co | Do. |
| Pier 75 | 140 and 132 | 138 | Lehigh Coal & Navigation Co. | Lehigh Coal & Navigation Co. |
| Pier 76 | 90 and 80 | 65 | Wm. Cramp & Sons Ship & Engine Building Co. | Do. |
| Pier 77 | 220 and 75 | 35 | do | Wm. Cramp & Sons Ship & Engine Building Co. |
| Pier 78 | 75 | 28 | do | Do. |
| Pier 79 | 75 and 245 | 25 | do | Do. |
| Pier 80 | 471 and 520 | 74 | do | Do. |
| Pier 81 | 265 and 150 | 61 | do | Do. |
| Pier 82 | 170 and 40 | 72 | do | Do. |
| Pier 83 | 72 | 29 | do | Do. |
| Pier 85 | 110 | 10 | do | Do. |
| Pier 86 | 120 and 160 | 73 | do | Do. |
| Pier 20 | 900 and 765 | 67 | do | Do. |
| Pier 18 | 764 | 70 | Philadelphia & Reading Ry. Co. | Philadelphia & Reading Ry. Co. |
| Pier 16 | 441 | 56 | do | Do. |
| Pier 14 | 310 and 774 | 133 | do | Do. |
| Pier 13 | 493 | 80 | do | Do. |
| Pier 12 | 200 | 48 | do | Do. |
| Pier 11 | 710 | 81 | do | Do. |
| Pier 10 | 198 and 250 | 50 | do | Do. |
| Pier 9 | 200 | 38 | do | Do. |
| Pier 8 | 357 | 29 | do | Do. |
| Pier 7 | 360 | 35 | do | Do. |
| Pier 6 | 357 | 28 | do | Do. |
| Pier 5 | 235 | 33 | do | Do. |
| Pier 4 | 205 | 29 | do | Do. |
| Pier 3 | 185 | 30 | do | Do. |
| Pier 2 | 185 | 32 | do | Do. |
| Pier 1 | 185 | 34 | do | Do. |

[a] Half pier.

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| Piers and slips. | Length. | Width. | Occupants. | Owners. |
|---|---|---|---|---|
| DELAWARE RIVER, NORTH OF MARKET STREET—con. | *Feet.* | *Feet.* | | |
| Pier A | 682 | 169 | Philadelphia Transatlantic Line. | Wm. Cramp & Sons Ship Engine Building Co. |
| Pier B | 726 | 140 | Philadelphia Grain Elevator Co. | Do. |
| Pier C | 645 | 150 | Cosmopolitan Steamship Co. | Do. |
| Pier D | 695 and 660 | 200 | Manchester Line | Do. |
| Pier G | 800 and 630 | 142 | Philadelphia & Reading Ry. Co. | Do. |
| Pier H | 414 and 480 | 99 | ....do | Do. |
| Three car bridges | | | ....do | Do. |
| Pier 126 | 526 and 495 | 57 | Recreation pier | City. |

**Type of wharf construction.**—The prevailing type of wharf construction at the port of Philadelphia is well described in the following extract from a paper on "Types of American Public Wharf Construction," which was read before the third annual meeting of the American Association of Port Authorities:[a]

As at New York, Philadelphia wharves are usually open piers. Philadelphia has, however, sought to develop a type of pier that will be permanent from mean water up, yet having the cheapness of a wooden pile subaqueous substructure. The piers now constructed may be thus summarized: Transverse bents of two rows of piles are cut off approximately at 1½ feet above low water; the bents are spaced 20 feet center to center, longitudinally, of the pile. The piles are clamped and capped and this framing is covered with a light timber deck upon which are set concrete walls approximately 11 feet high, these walls being in reality continuations of the pile bents to the pier deck. These cross walls support a system of steel floor beams overlaid by a concrete deck, or a system of reinforced concrete floor beams and slabs. On the concrete deck is laid pavement as wearing surface.

**Port administration.**—The port of Philadelphia is under the control of the municipality, the administrative authority being exercised through the department of wharves, docks, and ferries. The head of this department is known as the director and is appointed by the mayor, subject to ratification by the select council. His term is four years and he is paid a salary of $10,000 a year. He is assisted by an assistant director, whom he appoints. The assistant director, who must be a practicing civil engineer, receives a salary of $4,000 a year.

The department of wharves, docks, and ferries was created by an act of the legislature[b] approved June 8, 1907. At the same time a board of commissioners of navigation for the Delaware River and its navigable tributaries was also created. This board consists of five members. One member must be the director of the department of wharves, docks, and ferries, who is president of the board; two members are selected by the mayor of Philadelphia from such commercial bodies as the select council designates; one is selected by the council of the city of Chester; and one, by the burgess and council of the borough of Bristol. The members hold office for terms of four years and serve without compensation.

The chief difference between these two port authorities is in their jurisdiction, the authority of the department of wharves, docks, and ferries being confined to the city of Philadelphia, while that of the commissioners of navigation is confined to the Delaware River and

[a] Proceedings and Papers of Third Meeting, held at Baltimore, Md., September, 1914, p. 197.
[b] Act No. 321.

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its navigable tributaries within the State but outside the limits of the city of Philadelphia. The legislature allowed Philadelphia free scope of action within its own limits, but required that city to work jointly with the other principal municipalities along the river in all matters affecting the river beyond the limits of the city.

*Department of wharves, docks, and ferries.*—The powers vested in the director of the department of wharves, docks, and ferries are indicated in the following provisions:

1. The director shall have power to make surveys and soundings and to prepare plans therefrom and to keep records thereof. He shall also have power to regulate, fix, and establish bulkhead and pierhead lines, and the distance between piers, subject to the regulations of the United States Government, and to adopt and promulgate rules and regulations for the construction, extension, alteration, improvement, and repair of wharves, piers, bulkheads, docks, slips, and basins within the limits of said cities.

2. The director shall have charge, control, and supervision of all the wharf and storage property belonging to the city.

3. The director shall have authority, after appropriation by councils of said cities of the money required therefor, to acquire by the purchase, in the name of, and for the benefit of said cities, such unimproved marshlands, within said cities, as may be reclaimable, * * * and after appropriation of the money required therefor by said councils, to reclaim, fill in, and improve said marshlands and construct thereon wharves, piers, docks, slips, basins, and storage facilities.

4. The director shall have authority to acquire by purchase such lands, wharves, piers, bulkheads, etc., as may be required for the purposes of commerce and navigation.

5. The director shall have authority, after appropriation of the money required, to acquire by purchase lands, piers, or bulkheads, and to erect thereon such structures and buildings for storage and storage facilities as may be necessary for the proper and convenient use of such wharves, piers, and bulkheads * * * and he shall have power to make all rules necessary for the government of such storage facilities and fix all rates and charges for their use and occupation.

6. The director shall have authority to purchase, maintain, and operate such boats or launches, ice boats, and dredges as may be necessary.

7. Before the construction, expansion, or alteration of any wharf or other building in the nature of a wharf, application must be made to the director, plans and specifications filed, a public hearing held, and the approval of the director given.

8. The director has authority and power to remove obstructions from any pier or water-front property.

9. The director has power to regulate ferry service and to fix maximum rates and charges for ferriage and to regulate and fix maximum charges for wharfage, cranage, and dockage on all wharves, piers, and docks within the limits of the city.

10. The director is given the power of eminent domain, but he states that his authority under the present law is so hampered with restrictions as to diminish greatly its value.

11. The director has power to make leases, for a period not to exceed 10 years, of all or any of the water-front property and facilities belonging to the city, but only after the lease has been exposed to public sale after specific advertisement in two newspapers, and sold to the highest bidder by public sale, and vendue or outcry. In case no satisfactory bid is received, the director may order another sale or may make a lease for a term not exceeding one year.

12. All revenues and income from the water-front property of the city must be paid into the city treasury. All appropriations for the maintenance and operation of the department must be made by the select council out of the general funds of the municipality.

The department of wharves, docks, and ferries has about 170 employees and is divided into six divisions, as follows: Executive division, division of accounts and statistics, engineering division, division of dockmasters and wharfingers, division of repairs, and division of city ice boats and dredges.

In the calendar year 1913 the total expenditure of the department was $2,711,714.67. Of this total, $2,087,765.75 came from city funds and the balance, $623,948.92, from State funds.

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*Board of commissioners of navigation.*—The board of commissioners of navigation for the Delaware River and its navigable tributaries has within its jurisdiction many of the powers exercised by the department of wharves, docks, and ferries within the city of Philadelphia, such as the power to make surveys and soundings, to prepare plans, to regulate and establish bulkhead and pierhead lines, to fix rules for the construction, alteration, or extension of any wharf, pier, dock, slip, etc., and to grant permits for the same, to remove obstructions from the water front, to fix rates of wharfage, etc. In addition, the board has control of pilotage on the entire river and its navigable tributaries within the State, and examines, licenses, and controls all pilots.

**Port charges.**—*Pilotage.*—The rates of pilotage from the capes of the Delaware to the city of Philadelphia are $4.40 per foot draft for vessels drawing 12 feet or less and $5.50 per foot draft for vessels drawing more than 12 feet. The rates of pilotage outward are the same as for pilotage inward.[a]

Pilotage is compulsory for all vessels excepting inward-bound vessels not spoken outside of the capes, vessels engaged in the coastwise trade, and vessels "solely coal laden with coal mined in the United States."[b]

*Towage.*—Towing charges within the harbor limits of the port (from Greenwich to Port Richmond, an extreme distance of about 7 miles) are as follows:

Steamships: $20 for each tug used in the operation of shifting position in the stream, docking, or undocking.
Lighters: Light, $3; loaded, $4.
Lumber barges: Light, $5; loaded, $6.
Schooners: Light or loaded, prices ranging from $25 for 200 tons register and under to $39 for 4,000 tons register and upward.

Towing charges for coasting schooners and seagoing barges between Philadelphia and the sea, a distance of approximately 100 miles, are as follows:

| Register tonnage of vessel. | Charges for towing. | Register tonnage of vessel. | Charges for towing. |
|---|---|---|---|
| 200 tons or under | $58.00 | 2,500 to 3,000 tons | $198.00 |
| 200 to 500 tons | 70.00 | 3,000 to 3,500 tons | 228.00 |
| 500 to 1,000 tons | 91.00 | 3,500 to 4,000 tons | 258.00 |
| 1,000 to 1,500 tons | 115.00 | 4,000 to 4,500 tons | 288.00 |
| 1,500 to 2,000 tons | 139.00 | 4,500 to 5,000 tons | 318.00 |
| 2,000 to 2,500 tons | 168.00 | | |

*Dockage.*—At the city piers that are open to public use the charge for dockage is 1 cent per net register ton per day for steamers, and one-half cent per net ton per day for sailing vessels and barges, the minimum charge per day being $2. Most of the municipal piers, however, are leased on exclusive terms, the rental ranging from 25 to 40 cents per square foot of gross area of pier or wharf. At the railroad terminals no dockage is charged if vessel takes or discharges through freight

[a] Public Laws of Pennsylvania, act of May 11, 1889, as amended Mar. 30, 1899, sec. 1.
[b] Idem, act of Mar. 29, 1803, as amended June 8, 1907, sec. 29.

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*Wharfage.*—At the public piers owned by the city no charge is made for wharfage unless goods are not promptly removed. Goods can be stored on municipal piers that are open to public use at the following rates for each period of one month or part thereof:

| | | |
|---|---|---|
| Lumber | per 1,000 feet b. m.. | $0. 25 |
| Lath | do.... | .05 |
| Belgian blocks | do.... | .15 |
| Sand | per ton.. | .15 |
| Stone | do.... | .15 |

Rates for general merchandise are made on application. Ordinary lumber must be stored so as to have 2,250 feet b. m. and heavy lumber 2,000 feet b. m. to 1 linear foot of wharf space.

At the railroad terminals wharfage is absorbed on all through business.

*Switching.*—No charge for switching is made on any traffic which yields a revenue to the trunk-line railroad.

## PORTLAND, ME.

The city of Portland is located on Casco Bay, in the southwestern part of Maine, about 110 miles distant by water from Boston. The commercial part of the city is situated on a peninsula that extends in a northeasterly direction into the bay. The harbor consists of three parts, namely, Front Harbor, Fore River, and Back Cove.

Front Harbor is on the south side of the peninsula and at its eastern end. The Fore River section is also on the south side of the peninsula. Front Harbor and Fore River together constitute also the harbor of the city of South Portland, which lies along their southerly shores. Back Cove is on the north side of the peninsula. It is nearly landlocked, approximately circular in form, and about 1 mile in diameter.

Front Harbor and Fore River have been improved by dredging to the depth of 30 feet at mean low water, while Back Cove has a depth of 12 feet. The mean range of tide is 9 feet.[a] The north shores of Front Harbor and Fore River are the only parts of the harbor that have been extensively developed for commercial purposes. The south shores of Front Harbor and Fore River and the shores of Back Cove are largely undeveloped, while the most available part of the Back Cove water front is under railroad control or ownership.

**Railroads.**—Portland is served by the Boston & Maine Railroad with three separate lines, by the Maine Central with two lines, and by the Grand Trunk Railway system. The Grand Trunk Railway uses Portland extensively as a winter port.

A belt-line railway, which makes connection with all the railroads entering the city, passes entirely along the Front Harbor and Fore River shores and along the commercially available shores of Back Cove. This line is made up of parts of the railroads and is not controlled by any one organization, although arrangements are in force by which cars from any railroad can be delivered to any part of the belt line.

**Steamship lines.**—The principal coastwise line of steamships using this port is the Eastern Steamship Corporation. This company

[a] Report, Chief of Engineers, U. S. Army, 1914, p. 52.

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operates a freight and passenger service of one boat daily in each direction between Portland and Boston and of three boats weekly in each direction between Portland and New York, between Portland and Rockland, and between Portland and Boothbay. Ships of this company that make three trips weekly in each direction between Boston and St. John, New Brunswick, call at Portland.

Other coastwise ships that call at Portland are those of the Union Sulphur Co., which bring sulphur from Sabine Pass, Tex., and those of the Gulf Refining Co., which bring oil from Port Arthur, Tex.

Regular lines of foreign vessels call at Portland as a rule from December 1 to May 1, this being the period during which the Grand Trunk Railway uses Portland as a winter port. Among the lines engaged in this foreign trade are the following:

Allen Line, which maintains a fortnightly freight and passenger service between Portland and Glasgow.

Cunard-Thompson Line, which maintains on the average a weekly freight and passenger service between Portland and London.

White Star-Dominion Line, which maintains on the average a weekly service between Portland and Liverpool and a fortnightly service between Portland and Bristol, England.

Ships of Furness, Withy & Co., which maintains a somewhat irregular service of freight boats carrying china clay from Fowey, England.

The United States Army engineer at Portland stated that in a recent year there were 100 steamship sailings to British ports, and that of these sailings only 6 occurred during the summer season, while 94 were made during the months when the St. Lawrence River was closed to navigation. Twenty-four of these sailings were for Liverpool, 10 for Glasgow, 15 for London, 10 for Bristol, and the remainder for various other ports.

**Commerce of the port.**—According to the commercial statistics prepared by the United States Army engineer, the water-borne traffic, both coastwise and foreign, at the port of Portland in the calendar year 1913 amounted to 3,339,538 short tons, valued at $128,506,579.[a] Unfortunately these statistics do not show separately the coastwise and the foreign trade at this port, but some idea of the volume of foreign trade can be had from the trade statistics of the Bureau of Foreign and Domestic Commerce, which show that in the year ended June 30, 1913, the foreign trade at this port was valued at $8,747,680, the imports amounting to $1,815,308 and the exports to $6,932,372.

The principal commodities, as reported by the United States Army engineer, are shown in the following tabular statement:[a]

| Commodities. | Short tons. | | Commodities. | Short tons. | |
|---|---|---|---|---|---|
| | 1913 | 1914 | | 1913 | 1914 |
| Coal: | | | | | |
| Bituminous | 1,718,096 | 1,331,880 | Lumber and cooperage | 48,533 | 31,755 |
| Anthracite | 339,000 | 330,000 | China clay | 38,336 | 37,523 |
| Grain and flour | 407,068 | 303,774 | All other | 279,501 | 300,227 |
| General merchandise | 386,916 | 330,024 | Total | 3,339,538 | 2,777,760 |
| Pulp and pulp wood | 122,088 | 132,577 | | | |

[a] Report, Chief of Engineers, U. S. Army, 1914, p. 1584; idem, 1915, p. 2024.



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The coal traffic at this port has developed greatly in recent years, despite the extensive development of water power in the State of Maine. Likewise, a considerable increase is shown in the receipts of raw materials for paper and pulp mills in the State, which accounts for the large quantity shown above for pulp, pulpwood, and china clay.

The flour and grain trade is very extensive, as the Grand Trunk Railway uses this port largely for the shipment of these commodities to Great Britain.

A very interesting statement in regard to changes in the commerce of Portland is contained in a special report of the United States Army engineer in charge, under date of February 17, 1911.[a]

**Extent and ownership of water front.**—The total water front of the three parts of the harbor is about 8 miles. The city of Portland has a frontage of about 2½ miles on Front Harbor and about 1¾ miles on Fore River. The city of South Portland, which runs along the southerly shores of Front Harbor and Fore River, has a water front of about 2½ miles. On Back Cove the frontage that is at present available is about 1¾ miles in extent.

The northern shores of Front Harbor and Fore River are the only parts of the harbor that have been extensively developed for commercial purposes. The southern, or South Portland, shores of Front Harbor and Fore River and the shores of Back Cove are largely undeveloped. The railroad wharves are divided into two groups, one of which lies at the extreme eastern end and the other at the extreme western end of the commercial section of Portland. Between the railroad terminals are a number of wharves that are used for general mercantile and manufacturing purposes.

The railroad wharves are on the whole modern and well equipped, but the commercial and industrial piers are as a rule very inadequate. Most of these piers are long and have narrow, shallow slips alongside. Most of them were built in the early days of the city to accommodate the light-draft vessels that were engaged in the West India trade which flourished at the time. Since the decline of the trade of the port these piers have come to be used for general business rather than for strictly port purposes. Many have been laid out like streets and have been subdivided into parcels, which have been sold like city lots. Their proximity to the wholesale and retail business district of the city makes their value greater for their present use than for purely commercial purposes.

None of the wharves at Portland is publicly owned. The city of Portland owns, however, two parcels of land on the water front. One of these is at the end of Thames Street in the main part of the harbor, but it is suitable only for a boat landing. The second tract has a frontage of about 500 feet and is located on Front Harbor. The United States Army engineer in charge of the Portland district states that this is a "suitable location for a large public pier with railroad and highway connections." In recent years more or less talk has been heard of the purchase by the municipality of certain sections of the old water front, but no definite action has as yet been taken.

[a] House Document No. 489, Sixty-second Congress, second session, p. 4.

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**Terminals.**—The transportation terminals are the most important. For convenience these may be subdivided into three groups as follows: The Grand Trunk Railway terminals, the Portland Terminal Co. terminals, and the coastwise steamship terminals.[a]

*Grand Trunk Railway terminals.*—With the exception of two small lots, the Grand Trunk owns a continuous stretch of about 1¼ miles on Front Harbor in addition to some frontage near the entrance to Back Cove. The property of this company has been improved by the erection of five piers. Four of these piers are located on Front Harbor and are known as New Wharf, Ocean Wharf, Atlantic Wharf, and Galt Wharf, while the fifth is a coal wharf at the entrance to Back Cove.

The New, Ocean, and Atlantic Wharves are used for handling transoceanic passenger and freight traffic. They are covered with freight sheds and provide six berths 500 to 550 feet long. Galt Wharf has no shed but has an elevated loading platform and provides a berth 450 feet long. The coal wharf is provided with a modern and efficient coal-handling plant which has pockets with large storage capacity and four towers with a handling capacity of about 3,360 short tons per day.

In the rear of the wharves on Front Harbor there is a large freight yard, with a capacity of 2,500 cars, in addition to stock yards that can accommodate 1,700 cattle and two grain elevators which have a combined capacity of 2,500,000 bushels and are connected with the piers by means of conveyer galleries.

The United States Army engineer at Portland reports that during the five months, December 1, 1912, to April 30, 1913, 65 transoceanic steamers were discharged and loaded at this terminal and 16,000 inbound passengers were received. The total volume of freight traffic over all the wharves of this terminal in that period was as follows:

| | Short tons. |
|---|---|
| Transoceanic: | |
| Received | 357,260 |
| Forwarded | 316,649 |
| Domestic: | |
| Freight harbor wharves | 31,613 |
| Coal pockets | 257,892 |
| Total | 963,414 |

*Portland Terminal Co. terminals.*—The Portland Terminal Co., which is a subsidiary of the Boston & Maine and Maine Central Railroads, owns a small section of water front at the extreme western end of the Portland shore of Front Harbor, in addition to almost the entire north shore of the improved part of Fore River.

This company has four wharves, known as Wharf No. 1, Wharf No. 2, Wharf No. 3, and Western Division Wharf. Wharf No. 3 can accommodate several vessels at one time but the other wharves have berths for only one vessel each. The depth of water is 30 feet at Wharves No. 1 and No. 3, 28 feet at Wharf No. 2, and 12 feet at Western Division Wharf.

Wharves No. 1 and No. 2 and Western Division Wharf are used principally for the handling of coal, although other bulk materials,

[a] The following data are taken largely from the Special Report of the Chief of Engineers, U. S. Army, on Water Terminal and Transfer Facilities (H. Doc. No. 226, 63d Cong., 1st sess.), pp. 53–68.

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such as sulphur, are handled at these terminals. Wharf No. 1 has coal pockets with a storage capacity of about 5,000 short tons and three towers with a combined capacity for handling 3,900 short tons per day. Wharf No. 2 has no pockets but has elevated runways with tramways and cars that automatically distribute coal to various piles or through chutes to cars or into the Portland Gas Light Co. coal shed near by. This wharf is equipped with two towers with a combined capacity for handling about 1,900 short tons per day.

Western Division Wharf has a coal shed with a storage capacity of about 5,000 short tons and one tower with a handling capacity of about 500 short tons per day. Wharves No. 1 and No. 2 are provided with railroad tracks and equipped to handle coal for interior shipments, while Western Division Wharf is equipped only for discharging and storing coal for use by the railroad.

Wharf No. 3 is equipped for the transshipment of heavy bulk freight and has railroad tracks along its entire length. The equipment of this wharf includes four towers, one derrick for handling heavy freight, one derrick for handling pulp wood from vessel to car, and portable diggers which move on the tracks and handle copper ore, etc., from open cars to vessels. In the calendar year 1913 the following tonnage was handled at the wharves of this company:

| | Tons. |
|---|---|
| Railroad coal | 350,830 |
| Commercial coal | 421,488 |
| Sulphur | 49,177 |
| Other commodities | 156,343 |
| Total | 977,838 |

*Coastwise steamship terminals.*—Three piers, namely, Franklin Wharf, Customhouse Wharf, and Portland Pier, are used by the coastwise steamships.

Franklin Wharf is leased and used exclusively by the Eastern Steamship Corporation. At this wharf there is a depth of water of from 20 to 23 feet. The wharf is provided with railroad tracks and loading platforms for transfer of commodities between water and rail. In the calendar year 1913, 496,000 short tons of freight and 700,000 passengers were handled over these wharves. The United States Army engineer reports that "although a large volume of business is done over Franklin Wharf, it is not highly efficient. Freight is all moved by hand, and on account of lack of space the arrangement of freight house and spur tracks is unsatisfactory. Freight is sometimes handled twice and sometimes carried in transfer between water and rail, although there are railroad tracks on the wharf."[a]

Customhouse Wharf is used by various lines of small steamers and by the vessels of the United States Lighthouse Department. It has a depth of water alongside of about 14 feet and is equipped with freight sheds but has no railroad track. In the calendar year 1913, 20,000 short tons of freight and 8,000 passengers were accommodated at this wharf.

Portland Pier is used by boats of the Island Ferry Co., which supplies service to several near-by points in the harbor and bay, by

[a] Special Report of Chief of Engineers, U. S. Army, on Water Terminal and Transfer Facilities (H. Doc. No. 226, 63d Cong., 1st sess.), p. 63.

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boats of the United States War Department, and by boats of the city of Portland. It is also used as a free public landing for small boats. In the calendar year 1912, 12,000 short tons of freight and 500,000 passengers were handled at this wharf. It has only 14 feet in depth of water alongside and is provided with a freight shed but no railroad track.

Eleven wharves are used chiefly for handling coal and lumber. All except two of these wharves are provided with spur railroad tracks. These wharves are used for the delivery of coal and lumber to retail dealers who occupy wharves. A very small amount of lumber, however, is transferred from rail to water. Only two coal wharves and three lumber wharves are used to any considerable extent. In a recent year the total traffic handled over these wharves amounted to about 630,000 short tons, of which 550,000 consisted of coal and 80,000 of lumber.

Three of the coal wharves have mechanical appliances for unloading coal, ample pockets for storage or for transfer to wagon or railroad, and automatic overhead tramways for distributing the coal as it is removed from the vessel to various points on the wharf. At the lumber wharves, derricks operated by electric power are used for transferring heavy timber.

Manufacturing establishments use seven wharves, three of which are located in Back Cove. These wharves have from 6 to 18 feet of water alongside. The aggregate volume of traffic handled over these wharves in 1913 was about 80,000 tons, of which about 90 per cent consisted of china clay and coal.

Three wharves are used in connection with repair of vessels, etc., while two others are used by oil-carrying vessels for the discharge of oil into storage tanks for local distribution and reshipment by rail. Six wharves may be designated as general business terminals. At two of these wharves practically all of the fish business of the port is done. In addition there are five wharves that are idle.

**Type of wharf construction.**—The prevailing type of construction is that of a long, narrow, solid-filled pier with granite bulkheads and with long, narrow, shallow slips between. Many of the piers are very old, having been built at a time when only small sailing vessels used this port and the West India trade was at its height. Their construction is such that they would be wrecked if an attempt were made to obtain adequate depths in the slips by dredging.

Practically the only well-built and modern piers are those owned by the Grand Trunk Railway, the Portland Terminal Co., and the Eastern Steamship Corporation.

**Port administration.**—The control of the harbor is vested in a State board known as the Commissioners of Harbor and Tidal Waters of Portland. The board consists of three commissioners who are appointed by the governor for a term of three years. They receive a salary of $200 per annum, which is paid by the city. For some time past there has been no harbor master, but a recent act of the legislature provides that a harbor master shall be appointed by the commissioners and paid by the city. Formerly the examination and licensing of pilots was under the control of a board of pilotage appointed by the Portland Board of Trade, but since July 1, 1915, this work has been in the charge of the commissioners. Port wardens are still chosen by the board of trade.

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**Port charges.**—*Pilotage.*—Pilotage is not compulsory. The rates are $2.50 per foot of greatest draft entering and $1.25 per foot draft leaving port. The rate for shifting in the harbor is $4.

*Towage.*—No data as to towage rates are available.

*Harbor dues.*—For some years past there has been no harbor master and no harbor dues have been collected.

*Dockage.*—The general rule is to make no charge against the vessel for tying up to any pier or wharf, since all the vessels using this port belong to persons owning piers or carry cargoes that are consigned to persons owning their own piers or to the railroad terminals for transshipment.

*Wharfage.*—Wharfage on through freight is absorbed by the railroad in the published through rates. No wharfage is collected on commodities handled over the piers of the Portland Terminal Co. for local delivery but at the Grand Trunk terminals a charge of 2 or 2½ cents per 100 pounds is made against commodities for local shipment. In the case of coal, ore, and sulphur handled in carload lots the wharfage is only 10 cents per gross ton.

*Switching.*—A switching charge of $3 per car is made by the Grand Trunk Railway for moving a car from its pier sheds to the Boston & Maine Railroad transfer track.

*Handling.*—For use of the coal towers and pockets of the Grand Trunk Railway and those of the Portland Terminal Co., a charge of 20 cents per long ton is made for coal and 25 cents for copper ore, iron ore, and sulphur.

## PROVIDENCE, R. I.

The port of Providence is located on the Providence River about 27 miles from the Atlantic Ocean. Providence River is a tidal stream which is formed by the union of the Seekonk River with several small streams at Providence. The river is from one-fifth to 1¼ miles wide between harbor lines and extends in a southerly direction for a distance of about 8 miles to a point where it widens into Narragansett Bay. The harbor comprises the upper portion of the river which lies north of Field's Point and is about 1½ miles long.[a]

From the Atlantic Ocean up through Narragansett Bay to within 14 miles of Providence there is a natural depth of more than 40 feet of water at mean low tide. For a distance of 3 miles more the natural depth is more than 30 feet. For the remainder of the distance to the city a 30-foot channel is now being dredged by the Federal Government. The channel will be 600 feet wide in the outer section while in the upper section it will extend the entire width of the river between harbor lines. On June 30, 1914, however, the maximum draft that could be carried to the city was 25 feet at mean low water. The mean range of tide in Providence Harbor is 4.7 feet.

In connection with the present project of improvement, it is interesting to note that Congress made appropriations for the same on condition that "no work in the harbor proper north of Fields Point shall be done until the Secretary of War is satisfied that the State and city have completed their proposed expenditures in the combined Providence and Pawtucket Harbors up to at least $2,000,000 for public terminals or other permanent public harbor improvements, or shall have given to the Secretary of War assurance satisfactory to

[a] Report, Chief of Engineers, U. S. Army, 1914, p. 116.

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him that the expenditure of the $2,000,000 aforesaid will be completed within a time satisfactory to him and not later than three years from the passage of this amendment."

It is understood that satisfactory assurance has been given the Secretary of War that the foregoing terms will be complied with, and work is now in progress for dredging Providence Harbor above Fields Point to a depth of 30 feet.

**Railroads.**—At present Providence is served by only one railroad, the New York, New Haven & Hartford, which has a number of lines extending through the city. The Southern New England Railroad Co., a subsidiary of the Grand Trunk Railway system, is constructing a railroad from Palmer, Mass., to Providence. When this road is completed, the Grand Trunk system will have two terminals in southern New England, the other being that of the Central Vermont Railway in New London, Conn.

This port has no separate and distinct marginal railroad, but all of the important wharves on both sides of the river are provided with spur or switching track connections with the New York, New Haven & Hartford Railroad. The tracks on the east and west sides of the river, however, lack direct connection with each other, connection being possible at present only by a long detour around the city or by handling cars in short trains drawn through the city at night by electric locomotive.

On the west side of the river, where the new State pier, the municipal quay, and several important private wharves are located, a broad thoroughfare, known as Allens Avenue, parallels the river and would provide an excellent highway for a marginal railroad. The New York, New Haven & Hartford Railroad has tracks laid in a portion of this street and a track has been laid by the Southern New England Railroad Co. in anticipation of its future connection with the water front. The latter company has made arrangements with the city to build an extension of its road along the new municipal quay for the joint use of all railroads. The city intends to lay out another parallel street to relieve Allens Avenue and also to provide for a direct connection between the east and west sides of the harbor.

**Steamship lines.**—The Fabre Line, which operates between Naples, Marseille, Cape Verde Islands, and New York, is the only line of trans-Atlantic steamships that calls regularly at the port of Providence.

Several lines operate regularly between Providence and New York City. The principal lines are those of the Colonial Navigation Co., the Hartford & New York Transportation Co., and the New England Navigation Co. Each company operates one freight and passenger boat daily in each direction between the two cities.

The Merchants & Miners' Transportation Co. operates three boats weekly in each direction between Providence and Baltimore via Newport News and Norfolk.

The Dyer Transportation Co., which owns two small freight boats, operates one boat daily, except Sunday, in each direction, between Providence and Fall River. Other local lines include the Block Island, Newport & Providence Steamboat Co., the Providence, Fall River & Newport Steamboat Co., and the Sakonnet Transportation Co.

Coal-carrying vessels and barges operate between Providence and Newport News, Norfolk, Baltimore, Philadelphia, Perth Amboy, South Amboy, and other coal terminals on the northern shore of

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New Jersey. The coal trade at Providence is large and a considerable number of vessels that operate more or less regularly are required to handle it. Oil vessels from Port Arthur, Tex., also call frequently at Providence.

**Commerce of the port.**—The water-borne commerce that passed through Providence Harbor amounted to 4,539,805 short tons, valued at $111,146,765, in the calendar year 1913 and to 4,104,404 short tons, valued at $254,014,508, in 1914. These totals include 520,757 tons to and from the Seekonk River.[a]

The principal commodities in the commerce of the port in the calendar years 1913 and 1914 are shown in the following tabular statement:

| Commodities. | Short tons. | | Value. | |
|---|---|---|---|---|
| | 1913 | 1914 | 1913 | 1914 |
| General merchandise[a] | 737,747 | 719,488 | $73,774,700 | $224,240,430 |
| Coal: | | | | |
| Anthracite | 601,273 | 590,206 | 3,225,475 | 3,172,945 |
| Bituminous | 2,505,350 | 2,229,102 | 8,963,646 | 7,961,181 |
| Total | 3,106,623 | 2,819,308 | 12,189,121 | 11,134,126 |
| Cotton | 40,800 | 49,036 | 9,792,000 | 3,677,700 |
| Miscellaneous | [b] 94,204 | 53,173 | 6,395,553 | 4,368,351 |
| Oil | 194,082 | 207,785 | 4,835,768 | 8,144,547 |
| Manufactured iron and steel | 79,829 | 43,039 | 1,682,952 | 986,462 |
| Oysters, fish, etc | 113,102 | (c) | 1,138,556 | (c) |
| All other | 173,418 | 212,580 | 1,338,115 | 1,462,892 |
| Grand total | 4,539,805 | 4,104,404 | 111,146,765 | 254,014,508 |

[a] Unclassified freight carried on regular steamship lines.
[b] Includes 3,265 tons of bone black, 21,913 tons of chemicals, 3,490 tons of copper bars, 11,103 tons of ice, 2,417 tons of asphalt, 1,700 tons of junk.
[c] Not separately reported.

**Extent and ownership of water front.**—The water frontage along the present established harbor lines is approximately 27,280 feet. The State of Rhode Island owns 701 feet; the city of Providence, 3,125 feet; railroad companies, 7,770 feet; steamship companies, 1,710 feet; wharf and dock companies, 1,050 feet; industrial companies, 2,195 feet; and other private interests the remainder, or about 10,729 feet. At the present time only about 14,250 feet of lineal frontage are in active use.

**Terminals.**—The public terminals include one pier recently constructed by the State of Rhode Island and one pier and a long quay wall recently constructed by the city of Providence, in addition to a smaller wharf owned by the city.

State Pier No. 1 is the first pier to be constructed on the frontage of 701 feet which is owned by the State. The remaining space may be used later for the construction of one large pier or two small ones. Pier No. 1 is 600 feet long and 120 feet wide and has slips on either side. These slips are dredged to a depth of 25 feet at mean low water, but this depth is to be increased to 30 feet. The substructure of the pier consists of creosoted piles with a creosoted-timber floor covered with 4½ inches of reinforced concrete with asphalt surface.

One railroad track, depressed so as to make the level of the car floor even with the surface of the pier, extends through the middle

[a] Report, Chief of Engineers, U. S. Army, 1914, p. 1634; idem, 1915, p. 2069.

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of the pier. Provision has been made for two surface tracks to be added when they shall be required. Connection is now made with a track of the New York, New Haven & Hartford Railroad in Allens Avenue, and provision has been made for connecting with the tracks of the Southern New England Railroad (Grand Trunk Railway system) when that railroad is completed.

The pier shed is 400 feet long and 110 feet wide, and is of steel construction. The pier extends 200 feet beyond the pier shed and this outer section provides a large area for open wharfage. The pier shed is two stories high for a distance of 192 feet, this section being fully equipped for handling foreign passenger traffic.

The sides of the shed on the first floor consist of steel doors that can be raised easily. A steel framework, to which tackle blocks can be attached, extends on each side of the pier shed, and by means of movable electric hoists that have been installed miscellaneous package freight can be readily transferred from slip to shed.

The land occupied by this pier cost $106,655, and the cost of construction of the pier, pier shed, tracks, equipment, etc., was $410,381. Land acquired for additional piers adjacent to this pier cost $150,568. These sums do not include interest on bonds, supervision, and incidental expenses.

The Fabre Line steamships use one-half of this pier under a preferential lease for a term of six years, the compensation to the State being a per capita payment of 5 cents per passenger landed or embarked and also a dockage charge, under certain conditions, of 1 cent per net register ton per day, in addition to wharfage charges.

The city of Providence has owned and maintained for a number of years a pier at the foot of Henderson Street, a short distance from the new State pier. This municipal pier is an open pier of pile-and-timber construction, and has an area of 60,612 square feet. On one side there is a slip 100 feet wide and 600 feet long. This slip has at present a depth of 18 feet at mean low water, but can be deepened to 30 feet. This slip is used jointly by the city and the owner of the adjoining pier. The pier has a spur-track connection with the track of the New York, New Haven & Hartford Railroad in Allens Avenue and is used for the delivery and storage of lumber, paving blocks, water pipe, sewer pipe, and other supplies used by the city. The city has under consideration the rebuilding of this pier in a more substantial manner.

The city has recently completed, at a cost of about $700,000, the construction of a massive granite quay wall extending a distance of about 3,000 feet north of Fields Point. A fill has been made behind this wall with material secured by dredging and grading, which gives this property an area of about 17 acres. The city plans to construct within the next three years extensive terminal facilities, new street approaches, and a right of way for the Southern New England Railroad, which will occupy a portion of the wharf. It is expected that funds will be provided also for the construction of railroad tracks along the wall and extending to Allens Avenue.

Up to March 1, 1915, the city had expended $867,747 in the purchase of land, construction of quay wall, dredging, and grading. The plans for additional improvements that would make the quay wall fully available call for the expenditure of $545,690.

The principal private terminals are those owned by the New York, New Haven & Hartford Railroad Co. and include the Harbor Junc-

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tion Wharf, the Wilkes-Barre Pier, and the wharves occupied by the New England Navigation Co. and the Merchants & Miners' Transportation Co.

The coal docks are the most active docks in the harbor, the most important being those of the Providence Gas Co., the Doe & Little Coal Co., the Sakonnet Coal Co., the R. E. Smith Coal Co., the Providence Coal Co., the Eastern Coal Co., Curran & Burton, John R. White, the United Coal Co., and the Narragansett Electric Lighting Co. One of the docks of the Eastern Coal Co. is equipped with a movable discharging tower 118 feet high which is equipped with an automatic grab bucket of 1½ tons capacity and can handle 360 tons per hour.

The general condition of the terminals in the early part of 1913 was summed up in the following statement:

> All sides of the harbor are provided with railroad tracks and where actual physical connection with the wharves does not exist it could be generally accomplished with little difficulty. * * * There are 68 wharves, mostly in fair condition, though a few are in very poor condition. Of these wharves 7 are open to all on equal terms, the business of 2 belonging to the New York, New Haven & Hartford Railroad Co., being almost exclusively the handling of coal for transfer from water carriers to cars destined for interior points in New England; 60 of the wharves are used for private business purposes; * * * one wharf is used only as a storage yard for freight cars. * * * The general efficiency of the 68 wharves, based on the purposes for which they are used and appliances available, is estimated as follows: Excellent, 5; very good, 5; good, 24; fair, 16; poor, 18. * * * Physical connection exists between the water terminals and railroads serving the locality in the case of 35 of these wharves. From 3 of these prorating contracts or agreements exist for forwarding freight; from the others freight is only billed at published tariffs. * * * Improved and adequate highways have been constructed to 48 of the 68 wharves.[a]

Since 1913 the new State pier has been completed and several private wharves have been built. At the present time three piers are being constructed for oil companies.

**Type of wharf construction.**—The prevailing type of wharf construction is that of short solid-filled piers.

**Port administration.**—All harbors in Rhode Island are under the control of a State board of harbor commissioners which has general supervision only and whose principal powers include the granting of licenses for the building of piers, wharves, bulkheads, or other structures on and along the navigable waterways of the State. This commission consists of three members who are appointed by the governor for terms of three years, one member retiring each year. The commissioners serve without compensation. There are no regular employees except a secretary.

Another State board, the Rhode Island Harbor Improvement Commission, was created by special act of the legislature in 1910 for the purpose of improving and developing shore property for public piers at Providence, East Providence, and Pawtucket. This commission also consists of three members who are appointed by the governor for terms of three years, one member retiring annually, and who serve without compensation. This commission has a staff of permanent employees consisting of a secretary, one chief engineer, four assistant engineers, and one superintendent of pier.

The State Harbor Improvement Commission has control only of that section of the water front which the State has acquired and

[a] Special report of Chief of Engineers, U. S. Army, on Water Terminal and Transfer Facilities (H. Doc. No. 226, 63d Cong., 1st sess.), p. 118.

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improved and for the development of which the legislature appropriated $1,000,000. The work of this commission merely supplements that of the city government.

The municipality has jurisdiction of all the water front within the limits of the city except that which the harbor improvement commission has acquired. The authority of the municipality is exercised through a committee of the city council and the department of public works in which one engineer, known as the bridge and harbor engineer, four assistant engineers, and three inspectors have been assigned chiefly to harbor-development work.

The only public terminal at Providence at present is State Pier No. 1, which is under the control of the Harbor Improvement Commission. When the wharf along the new municipal quay wall is completed, the city also will own and operate a public terminal. This will be a somewhat unusual situation and one which may call for a unification of port administrative authority. The only parallels are to be found in Buffalo and New York City, where the State of New York maintains public terminals for the Erie Canal traffic adjacent to municipal and private terminals.

Recently steps have been taken by the Providence Chamber of Commerce to coordinate the activities of all the State and municipal boards that have to do with port affairs. On March 30, 1915, a voluntary unofficial organization, known as the Metropolitan Terminal Development Association, was effected. The membership of this body includes representatives of the railroads and steamship lines as well as of the several official boards.

**Port charges.**—*Pilotage.*—All vessels entering or leaving the port of Providence, except coastwise vessels, vessels sailing from one port to another within the State, and fishing vessels, must pay charges for pilotage at rates fixed by the State pilot commissioners. The following is the schedule of rates of pilotage per foot of draft:

| Draft of vessels. | Rates. | Draft of vessels. | Rates. |
|---|---|---|---|
| 7½ feet and under | $1.25 | 14 to 14½ feet | $2.50 |
| 8 to 9½ feet | 1.50 | 15 to 15½ feet | 2.75 |
| 10 to 11½ feet | 1.75 | 16 to 16½ feet | 3.00 |
| 12 to 12½ feet | 2.00 | 17 to 17½ feet | 3.25 |
| 13 to 13½ feet | 2.25 | 18 feet and over | 3.50 |

*Towage.*—The prevailing charge for towage from anchorage in stream to berth or dock is about 1 cent per ton of cargo. There are, however, no established rates for towage, contracts being entered into with each party having this work done.

*Harbor dues.*—There are no harbor dues.

*Dockage.*—The several regular steamship lines are accommodated at wharves or piers leased by them while vessels bringing coal are provided with dock facilities by the consignees of the cargo. The only public terminal is State Pier No. 1, at which the ordinary charge for docking is 1 cent per register ton per day.

*Wharfage.*—At such private wharves as are open to public use, the prevailing wharfage charge for coal is 20 cents per ton, including unloading and transfer to car, and for lumber, 70 cents per 1,000 feet, including discharging.

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# CHAPTER II.

# SOUTH ATLANTIC PORTS.

## BALTIMORE, MD.

The port of Baltimore has long been one of the most prominent port in the United States on account of an extensive and diversified foreig and coastwise trade that is largely national in its character. The cit of Baltimore is situated at the head of the northwestern branch o the Patapsco River, about 11 miles above the point where the rive empties into Chesapeake Bay and about 151 miles from Cape Henr in Hampton Roads. The limits of the port, as defined by statute include the entire length of the Patapsco and its tributaries, with total deep-water frontage of approximately 120 miles. The mai portion of the harbor is shown on the map opposite this page.

The Patapsco is about 3¾ miles wide at its mouth, which lies be tween Bodkin Point and North Point. This width gradually decrease until at Fort Carroll, 6½ miles above Bodkin Point, it is about 1⅝ miles Above Fort Carroll the river again widens and then gradually con tracts until abreast of Fort McHenry at the entrance to the north western branch of the river. The river turns westward at For McHenry, and 1½ miles farther up is crossed by a drawbridge throug which the middle branch is entered.

The port of Baltimore includes the main stream of the Patapsco Northwest and Middle Branches, and several important creeks, such as Curtis Creek, Stoney Creek, Rock Creek, and Bodkin Creek.

The main ship channel in the Patapsco is 1,000 feet wide and 35 feet deep at mean low water and extends from deep water in Chesapeake Bay to Fort McHenry.

Northwest Branch is the principal portion of the harbor and has been described as "a landlocked tidal basin of irregular shape, extending from the southeast corner of the city about 3 miles, in general in a northwesterly direction, to within four blocks of the city's center, and having a width varying from about three-eighths to three-quarters of a mile. The only inflow of fresh water into this basin is from Jones Falls, a small stream which enters it on the northerly side about one-half mile below the upper end. This basin is maintained by the city." The upper portion of Northwest Branch is generally referred to as the Basin. The prevailing depth of water in Northwest Branch from Fort McHenry to the head is about 24 feet.[a]

Middle Branch is being improved by the Federal Government under a project that calls for a channel 4 miles long, 100 feet wide, and 27 feet deep at mean low water. The mean range of tide is about 1 foot.

Curtis Creek is the most important tributary of the Patapsco and flows into Curtis Bay about 6 miles southeast of the main harbor. The Federal Government is dredging a channel 2½ miles long, 250

[a] Special Report of Chief of Engineers, U. S. Army, on Water Terminal and Transfer Facilities (H. Doc. No. 226, 63d Cong., 1st sess.), p. 363.



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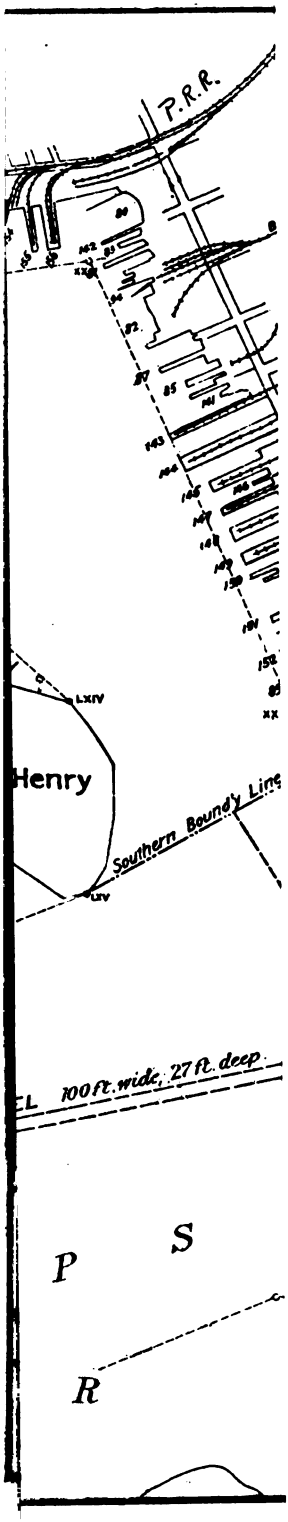


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feet wide, and 30 feet deep through Curtis Bay and Curtis Creek. About 1 mile above the entrance of the bay is the large coal pier of the Baltimore & Ohio Railroad.

Stoney Creek has a channel about 175 feet wide at its entrance, and much wider inside. A draft of 14 feet can be taken 1¼ miles above the entrance. Its commercial use is limited to local trade in farm products and cordwood.

Rock Creek has a general depth of 12 feet, but is only 8 feet deep at its entrance. It has a large local trade in farm products.

**Railroads.**—The port of Baltimore is served by three trunk-line railroads, namely, the Baltimore & Ohio, the Pennsylvania, and the Western Maryland Railroads, and by one local railroad, the Maryland & Pennsylvania Railroad, which operates in several adjoining counties.

Mention should be also made of the marginal railroad owned by the Canton Co. The Canton Railroad operates about 14 miles of track that serves the terminals of the Canton Co. and connects them with the Baltimore & Ohio, the Pennsylvania, and the Western Maryland Railroads.

The city of Baltimore is now engaged in the construction of a marginal street and of a belt-line railroad that will connect with the three trunk-line roads and also serve the wharves and piers along the water front. This railroad will provide switching facilities for long stretches of improved frontage along Light Street at the head of the Basin and along the southern shore of Northwest Branch, while the marginal street will coordinate and make more accessible the terminals in the improved section of the harbor and will probably open up a large frontage that is now undeveloped. The present status of this project is described by the harbor engineer in the following terms:

> The most difficult port problem now before the Harbor Board of Baltimore is the question of a municipal belt railroad. Such a road has been started, the tracks having been laid in the first section of the Key Highway and a contract for the installation of tracks in the second section will soon be awarded, and this belt road will be incorporated in the third section of the Key Highway and the marginal street known as McComas Street.
>
> The question before the board is just how these tracks can be incorporated into a general belt road in the event the city does not have the cooperation of the railroads. With the cooperation of the railroads, the problem is a very easy one; without their cooperation it becomes necessary for the city to either condemn the tracks in the bed of the public streets that could be incorporated into a belt line or to parallel the present tracks.
>
> Baltimore realizes the importance of owning and controlling water-front property, in consequence of which the city is now condemning large tracts of land adjoining the new proposed marginal street, which will give to the city nearly 7,000 linear feet of undeveloped water-front property, which will be held until such time as the demands warrant its development.

A complete marginal railroad serving all parts of the harbor could be secured by connecting the proposed municipal railroad with the tracks of the Baltimore & Ohio and the Western Maryland Railroads in southwestern Baltimore and with the tracks of the Baltimore & Ohio Railroad in Pratt Street, which extend through President and Aliceanna Streets and connect with the tracks of the Pennsylvania and the Canton Railroads.

**Steamship lines.**—The following table shows the principal lines of steamships engaged in foreign trade that call regularly at the port of Baltimore. All of the lines enumerated carry freight only, except

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the North German Lloyd Line, whose service is for passengers as well as freight.

| Lines. | Sailings. | Ports of destination. | Piers. |
|---|---|---|---|
| Atlantic Fruit Co | 1 weekly | Jamaican ports | Municipal Pier No. 2. |
| Do | do | | Do. |
| Atlantic Transport Co | 2 monthly | London | Pa. R. R. piers. |
| Do | 1 monthly | Havre | Canton piers. |
| Do | 2 monthly | Antwerp,[a] Havre | B. & O. piers. |
| Donaldson Line | 1 every 2 weeks | Glasgow | Do. |
| Furness Line | do | Leith | Pa. R. R. piers. |
| Hamburg-American Line [a] | 1 every 10 days | Hamburg | Do. |
| Holland-America Line | do | Rotterdam | B. & O. piers. |
| Johnston Line | 3 monthly | Liverpool | Do. |
| Lord Line | 2 monthly | Belfast, Dublin | Pa. R. R. piers. |
| Munson Line | 1 monthly | Colon | No. regular pier. |
| Do | 2 monthly | Havana | Do. |
| North German Lloyd Line [a] | 1 weekly | Bremen | B. & O. piers. |
| Red Star Line [a] | 1 every 2 weeks | Antwerp | Pa. R. R. piers. |
| Scandinavian-American Line | 1 weekly | Christiania, Copenhagen. | B. & O. piers. |
| United Fruit Co | do | Jamaica | Municipal Pier No. 1. |

[a] Service suspended during war in Europe.

The following table contains a list of the principal lines engaged in the coastwise and local bay trade of this port, with number of sailings and ports of call:

| Lines. | Sailings. | Ports of call. |
|---|---|---|
| Baltimore & Carolina Steamship Co | 1 weekly | Wilmington, N. C., Georgetown and Charleston, S. C. |
| Baltimore, Chesapeake & Atlantic and Maryland, Delaware & Virginia Ry. Cos. | 70 weekly | Various Chesapeake Bay ports in Maryland and Virginia; also to Washington, D. C. |
| Baltimore & Philadelphia Steamboat Co | 1 daily except Sunday [a] | Philadelphia via Chesapeake and Delaware Canal. |
| Baltimore Steam Packet Co | 1 daily | Norfolk. |
| Chesapeake Steamship Co | do | Do. |
| Do | 3 weekly | West Point, Va., for Richmond via Southern Ry. |
| Merchants & Miners' Transportation Co | do | Newport News, Norfolk, and Providence. |
| Do | do | Newport News, Norfolk, and Boston. |
| Do | do | Savannah and Jacksonville. |
| New York & Baltimore Transportation Line | do | New York. |
| Tolchester Co | 1 daily in winter [b] | Chesapeake Bay ports. |

[a] Also excursion boats daily, June 15 to Sept. 15.
[b] Excursion boats in summer.

**Commerce of the port.**—Statistics compiled by the United States Army engineer in charge of the Baltimore district show that the commerce of the port of Baltimore, including Canadian articles received in bond for export, amounted to 14,781,548 short tons, valued at $439,906,468, in the calendar year 1913, and 13,425,185 short tons, valued at $383,401,736, in the calendar year 1914.[a] The following is a summary of the commerce in 1913 and 1914:

[a] Report, Chief of Engineers, U. S. Army, 1914, pp. 1849-1851; idem, 1915, pp. 2251-2253.

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| Class of trade. | Short tons. | | Value. | |
|---|---|---|---|---|
| | 1913 | 1914 | 1913 | 1914 |
| Foreign: | | | | |
| Imports | 2,298,270 | 1,676,844 | $35,553,514 | $30,317,891 |
| Exports | 2,714,894 | 2,569,282 | 117,269,378 | 106,822,295 |
| Canadian | 395,380 | 186,879 | 13,246,779 | 6,440,706 |
| Total | 5,408,544 | 4,433,005 | 166,069,671 | 143,580,892 |
| Coastwise and domestic | 9,373,004 | 8,992,180 | 273,836,797 | 239,820,844 |
| Total | 14,781,548 | 13,425,185 | 439,906,468 | 383,401,736 |

*Foreign trade.*—The following is a list of the principal foreign commodities imported in 1913 and 1914:

| Articles. | Short tons. | | Value. | |
|---|---|---|---|---|
| | 1913 | 1914 | 1913 | 1914 |
| Pig iron | 74,113 | 52,081 | $3,411,160 | $2,367,323 |
| Iron ore | 1,076,652 | 514,878 | 3,186,388 | 1,431,439 |
| Nitrate of soda | 89,682 | 54,671 | 2,326,218 | 1,415,288 |
| Potash | 68,362 | 48,022 | 2,161,395 | 1,547,909 |
| Cork manufacture | 1,030 | 1,060 | 1,853,298 | 1,907,862 |
| Toys and dolls | (a) | ---------- | 1,522,094 | 1,101,408 |
| Wood pulp | 42,426 | 63,437 | 1,382,258 | 2,177,729 |
| Bananas | 114,109 | 120,153 | 1,197,727 | 1,348,966 |
| China, etc. | (a) | ---------- | 1,138,656 | 842,482 |
| Fertilizers | 126,592 | 90,205 | 1,045,747 | 984,285 |
| Sulphur ore | 161,565 | 160,631 | 985,381 | 979,661 |
| Burlaps | 5,515 | 5,377 | 962,403 | 912,070 |
| Manganese ore | 170,056 | 146,233 | 961,622 | 1,045,307 |
| All other | 368,168 | 420,096 | 13,419,167 | 12,256,162 |
| Total | 2,298,270 | 1,676,844 | 35,553,514 | 30,317,891 |

a Not reported.

The following is a list of the principal commodities exported in 1913 and 1914:

| Commodities. | Short tons. | | Value. | |
|---|---|---|---|---|
| | 1913 | 1914 | 1913 | 1914 |
| Copper | 135,460 | 112,386 | $41,141,916 | $30,754,670 |
| Wheat | 400,505 | 451,741 | 12,934,836 | 16,546,765 |
| Corn | 511,715 | 83,969 | 10,254,543 | 2,362,351 |
| Tobacco, leaf and stems | 48,863 | 35,872 | 9,780,752 | 7,917,680 |
| Cotton, raw | 34,307 | 25,285 | 8,969,787 | 6,193,249 |
| Iron and steel manufactures | 110,556 | 60,397 | 4,711,795 | 2,726,867 |
| Flour | 86,097 | 89,792 | 4,107,449 | 4,352,277 |
| Lard | 16,030 | 9,252 | 3,526,886 | 1,994,432 |
| Agricultural implements | 29,946 | 24,256 | 2,994,605 | 2,422,845 |
| Animal feed | 96,803 | 20,252 | 2,449,133 | 543,312 |
| Coal | 873,413 | 945,308 | 2,350,275 | 2,645,726 |
| Lumber and wood, manufactures of | 99,757 | 61,317 | 2,244,538 | 1,226,349 |
| Cottonseed oil, cake, and meal | 67,851 | 21,843 | 2,060,865 | 705,771 |
| Oil, lubricating | 46,949 | 31,299 | 1,648,470 | 1,164,547 |
| Neutral lard and oleo oil | 4,811 | 3,183 | 1,111,679 | 686,203 |
| All other | 151,831 | 592,958 | 6,981,849 | 24,579,251 |
| Total | 2,714,894 | 2,569,282 | 117,269,378 | 106,822,295 |

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*Coastwise and domestic trade.*—The coastwise and domestic trade forms more than three-fifths of the total commerce of the port and was reported for the first time in 1913. The principal commodities in this trade in 1913 and 1914 were the following:

| Commodities. | Short tons. | | Value. | |
|---|---|---|---|---|
| | 1913 | 1914 | 1913 | 1914 |
| General merchandise | 1,481,818 | 1,675,621 | $148,181,800 | $167,562,100 |
| Boots and shoes | 25,781 | (a) | 34,374,640 | (a) |
| Tobacco, leaf and manufactures | 55,723 | (a) | 13,617,800 | (a) |
| Coal | 3,297,067 | 3,740,792 | 10,029,701 | 11,222,376 |
| Fertilizer and materials | 676,676 | 579,275 | 9,080,140 | 8,689,125 |
| Cotton manufactures | 23,058 | 21,232 | 6,917,400 | 6,369,600 |
| Whisky | 10,400 | (a) | 5,942,856 | (a) |
| Lumber | 595,199 | 587,056 | 5,931,541 | 5,870,506 |
| Canned goods | 96,768 | 128,031 | 5,334,394 | 6,685,192 |
| Cotton, raw | 19,510 | 12,191 | 4,877,500 | 2,438,150 |
| Wool | 10,368 | (a) | 4,147,200 | (a) |
| Acid, sulphuric | 412,000 | 220,049 | 2,884,000 | 1,540,343 |
| Iron and steel manufactures | 34,983 | 39,810 | 2,798,640 | 3,184,800 |
| Leather | 2,784 | (a) | 2,672,640 | (a) |
| Naval stores | 29,976 | (a) | 2,398,080 | (a) |
| Cans, empty | 34,578 | 17,320 | 2,036,230 | 1,018,646 |
| Flour | 36,226 | 19,816 | 1,811,300 | 990,775 |
| Ore | 170,000 | 135,198 | 1,500,000 | 1,351,980 |
| Wheat | 49,968 | a 41,473 | 1,499,036 | b 1,235,204 |
| Oysters | 106,058 | 184,871 | 1,352,596 | 1,874,958 |
| Fruit and farm produce | 76,685 | 127,491 | 1,187,671 | 1,912,365 |
| All other | 2,127,378 | (a) | 5,261,632 | (a) |
| Total | 9,373,004 | 8,992,180 | 273,836,797 | 239,820,844 |

a Not separately reported. b Including corn.

The Canadian commodities shipped in bond in 1913 through the port of Baltimore consisted largely of breadstuffs, including 12,690,009 bushels of wheat, valued at $12,561,632, and 82,516 barrels of flour, valued at $312,917.

**Extent and ownership of water front.**—The Harbor Board of Baltimore has jurisdiction over approximately 120 miles of shore line fronting on channels 10 feet or more in depth. The distribution of this frontage is indicated in the following summary:[a]

| Section of harbor. | Frontage. | Section of harbor. | Frontage. |
|---|---|---|---|
| | *Miles.* | | *Miles.* |
| Northwest Branch (main harbor) | 27.75 | South Shore—Continued. | |
| Main and Middle Branches: | | Rock Creek | 6.00 |
| Light Street Bridge to Fort McHenry | 2.25 | Bodkin Creek | 8.00 |
| Light Street Bridge to Old Quarantine | 3.00 | North Shore: | |
| Spring Gardens (Middle Branch) | 4.25 | Lazaretto to North Point | 10.50 |
| South Shore: | | Colgate Creek | 2.00 |
| Old Quarantine to Bodkin Point | 12.25 | Bear Creek | 19.50 |
| Curtis Creek | 16.50 | Total | 120.00 |
| Stoney Creek | 8.00 | | |

The available frontage within the corporate limits of the city of Baltimore is about 37¼ miles, the city owning about 5 miles and private interests about 32¼ miles. It is reported that industrial companies own 19 miles, railroad companies 10 miles, wharf and dock companies 2 miles, and steamship companies 1¼ miles.

a Report of Harbor Board for 1913, p. 33.

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Prior to the great fire in 1904 the city of Baltimore owned comparatively little water-front property of commercial value. After the fire the legislature created the burnt district commission which was given the power to purchase water-front property and to build terminals. With this power and with funds that were provided, this commission acquired all of the burnt district fronting on the harbor. In this way the city became the owner of about 4,000 feet of direct water front adjacent to the principal business district of the city. It has since improved this frontage with piers.

**Terminals.**—The city of Baltimore owns a number of piers at the head of the Basin and adjacent to the main commercial district of the city. The location, dimensions, area, and occupants of these piers are indicated in the following table:

| Piers. | Locations. | Occupants. | Length. | Width. | Area. |
|---|---|---|---|---|---|
| | | | *Feet.* | *Feet.* | *Sq. ft.* |
| A | Calvert Street | City tugs | 64 | 8 | 512 |
| No. 1 | South Street | Baltimore, Chesapeake & Atlantic Ry., United Fruit Co. | 551 | 150 | 82,108 |
| No. 2 | Commerce Street | Various [a] | 638 | 199 | 127,163 |
| No. 3 | Gay Street | Merchants & Miners' Transportation Co. | 772 | 199 | 153,362 |
| No. 4 | Frederick Street | General wharfage for market boats | 927 | 193 | 178,875 |
| No. 5 | Market Place | General wharfage and Baltimore Steam Packet Co. | 1,150 | 214 | 245,574 |
| No. 6 | West Falls Avenue | General wharfage for lumber trade | 1,450 | 150 | 218,797 |
| No. 7 | President Street | City tugs and boats | 400 | 100 | 40,000 |
| No. 8 | Albemarle Street | General wharfage for lumber trade | 500 | 130 | 65,000 |
| Recreation | Broadway | | 500 | 150 | 75,000 |
| Do | Barre Street | Baltimore Steam Packet Co | 140 | 113 | 15,820 |

[a] Includes Arundel Sand & Gravel Co., Atlantic Fruit Co., Baltimore & Carolina Steamship Co., Lanassa & Goffe Line, Standard Oil Co., and Martin Wagner Co.

In addition to the above-named piers, the city of Baltimore owns one pier and the city and the State of Maryland, jointly, another pier at the head of the main channel. The city pier is 130 feet long, while the pier owned jointly by the city and the State is 90 feet long. Both piers are leased to the Baltimore, Cheaspeake & Atlantic Railway Co. and the Maryland, Delaware & Virginia Railway Co.

The State of Maryland owns and operates two large tobaccco warehouses that are located at the head of the Basin. The warehouses are, respectively, four and six stories in height and are of reinforced concrete and brick construction.

*Baltimore & Ohio Railroad terminals.*—The terminals of the Baltimore & Ohio Railroad are probably the most extensive terminals at this port. The most active piers of this railroad are located on the south, or Locust Point, side of the northwestern branch and cover about 75 acres. They include 7 wharves, 10 piers, extensive pier sheds, and 2 grain elevators with a combined capacity of 3,000,000 bushels. The following table shows the dimensions and principal use of the several wharves and piers.



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| Location and number of piers.[a] | Length. | Width. | Use. |
|---|---|---|---|
| Northwest Branch: | | | |
| South side (Locust Point)— | *Feet.* | *Feet.* | |
| Pier 211 | 300 | ..... | Coaling vessels. |
| Pier 212 | 150 | ..... | Do. |
| Pier 213 | 400 | ..... | Do. |
| Pier 214 | 180 | ..... | Do. |
| Pier 210 | 600 | ..... | Foreign freight. |
| Pier 209 | 855 | 160 | Do. |
| Pier 208 | 980 | 160 | Do. |
| Pier 205 | 330 | ..... | Domestic freight. |
| Pier 203 | 200 | 80 | Foreign and domestic freight. |
| Pier 204 | 200 | 110 | |
| Pier 223 | 150 | ..... | Car transfer float. |
| Pier 224 | 400 | 150 | Foreign freight. |
| Pier 236 | 400 | 130 | Grain elevator. |
| Pier 228 | 220 | 40 | Foreign freight. |
| Pier 234 | 1,160 | 120 | Grain elevator. |
| Pier 231 | 1,125 | 108 | Foreign and coastwise freight. |
| Pier 233 | 500 | 40 | Foreign freight. |
| North side— | | | |
| Pier 55 | 150 | 250 | Local freight. |
| Pier 61 | ..... | 140 | Leased to Booth Packing Co. |
| Pier 66 | ..... | 320 | Leased to R. E. Roberts Co. |
| Canton: | | | |
| Pier 94 | 350 | 300 | Car transfer float. |
| Curtis Bay: | | | |
| Pier 132 | 800 | 60 | Coaling vessels. |
| | 820 | 100 | Foreign freight. |

[a] Numbers are those given on the map facing page 140 but not those ordinarily used.

Nine of the 11 piers have sheds, while 2 are open structures. The most important of these are Piers 208 and 209, which are commonly known as Piers 8 and 9, respectively. Pier 8, which is 980 feet long and 160 feet wide, has a two-story shed, 941 feet long and 138 feet wide, with a floor area of approximately 259,000 square feet. This pier is equipped with a telpherage system (Sprague type) which is operated by electricity on a series of overhead tracks. On these tracks which have a total length of 1½ miles, are operated 20 carriers, 10 of 2-ton and 10 of 4-ton capacity. Pier 9, which is 855 feet long and 160 feet wide, has a two-story shed, 800 feet long and 138 feet wide, with a floor area of 220,800 square feet. The second floor of this shed is used for the reception of immigrants. A portion of the shed is also used as a bonded warehouse.

Four of the piers at Locust Point and one on Curtis Bay are used for the coal-shipping business of the Baltimore & Ohio Railroad. The total quantity of coal discharged into vessels at these piers in 1913 was 3,191,421 tons. The pier at Curtis Bay is the most modern and efficient coal terminal operated by this railroad and it is said to have a capacity for handling 14,000 tons of coal per day. The terminals at Curtis Bay include a large general freight pier, 820 feet long and 100 feet wide, and a slip for a car-transfer float or bridge. The pier has a one-story shed with a floor area of 52,600 square feet.

The Baltimore & Ohio Railroad owns several parcels of improved water-front property adjacent to the main business district of the city on the north side of the northwestern branch. Two parcels are leased to canning companies while the third is used by the railroad as a general freight station. The frontage owned in Canton is occupied by a car-transfer float for the interchange of cars between the various terminals in Canton and the Locust Point terminals of the Baltimore & Ohio.

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*Pennsylvania Railroad terminals.*—The terminals of the Pennsylvania Railroad Co. also are extensive. They are divided into three groups, all of which are located in the Canton section of the harbor. Two groups belong to the Northern Central Railway division and one to the Philadelphia, Baltimore & Washington division.

One group of the Northern Central Railway terminals is located on the north side of the northwestern branch opposite the Locust Point terminals of the Baltimore & Ohio Railroad, while the other is on the main river in lower Canton. The former covers more than 100 acres and includes seven piers for general freight, one coal pier, one grain-elevator pier, and two warehouses, as is indicated in the following table:

| Piers. | Length. | Width. | Open or covered. | Use. |
|---|---|---|---|---|
| | *Feet.* | *Feet.* | | |
| Pier 1½ | 161 | 26 | Open | Lighter traffic. |
| Pier 2 | 500 | 70 | Covered | Do. |
| Pier 3 | 929 | 121 | do | Foreign freight. |
| Pier 4 | 982 | 100 | do | Foreign and coastwise freight. |
| Pier 5 | 500 | 35 | Open | Foreign freight. |
| Pier 6 | 935 | 120 | Covered | Do. |
| Pier 7 | 932<br>780 | 50 | Open | Do. |
| Elevator pier | 498 | 100 | Covered | Grain. |
| Coal pier | 781 | 49 | Open | Coal. |

One of the warehouses is 135 feet long and 83 feet wide and is used chiefly for commodities carried by lighters to and from bay line steamers. The other warehouse is 270 feet long and 42 feet wide and is used for goods shipped in bond. The grain elevator has a capacity of 500,000 bushels.

The Northern Central Railway terminals in the lower section of Canton include an iron-ore pier or trestle and a grain-elevator pier. The ore pier is an open structure, 1,108 feet long and 62 feet wide, and has four tracks with a capacity of 110 cars. It is used for handling inward-bound cargoes of iron ore and outward-bound cargoes of steel rails, structural steel, etc. The grain elevator pier is 603 feet long and 123 feet wide. The elevator proper has a storage capacity of 1,000,000 bushels and, in addition, there are concrete storage bins with a capacity of 1,000,000 bushels. Another terminal owned by the Northern Central Railway is located at the foot of Bond Street, near the main business district of Baltimore. It is known as Jackson's Wharf and consists of a bulkhead with a frontage of about 300 feet. It is used chiefly for local freight.

The terminals of the Philadelphia, Baltimore & Washington division of the Pennsylvania system are located on the north side of the northwestern branch and include three piers, two for anthracite coal and one for general freight, and one car-transfer float or bridge. One of the coal piers is 398 feet long and 50 feet wide and has three tracks with a capacity of 30 cars. The other coal pier is 396 feet long and 100 feet wide and has five tracks with a capacity of 55 cars. The general freight pier is approximately 400 feet long and 230 feet wide.

*Western Maryland Railway terminals.*—The principal terminals of the Western Maryland Railway Co. are located at Port Covington, in the southern section of the city. The terminals cover an area of 170 acres

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and have space for 2,000 cars. They include one coal pier 1,295 feet long and 60 feet wide, one covered pier 836 feet long and 120 feet wide, and one open pier 830 feet long and 62 feet wide, in addition to two car-transfer bridges or pontoons for transferring cars to floats. The open pier has four tracks and is equipped with one locomotive crane.

The Western Maryland Railway is now engaged in the construction at Port Covington of a reinforced concrete elevator and storage bins. The elevator will have a capacity of 179,000 bushels and the bins 721,000 bushels. Adjacent to the main business district of the city is another pier owned by the Western Maryland Railway. This pier, which is known as Brown's Wharf, is improved by storage-warehouse buildings and sheds.

*Steamship terminals.*—A large amount of frontage is occupied by coastwise and local steamship lines, most of which have terminals on the west side of the Basin along Light Street, between Pratt and Lee Streets. The Baltimore & Philadelphia Steamboat Co. (Ericsson Line) owns a portion of the frontage (about 430 feet) occupied by its boats. The Baltimore, Chesapeake & Atlantic Railway Co. and the Maryland, Delaware & Virginia Railway Co., both of which are controlled by the Pennsylvania Railroad, occupy nine small piers along Light Street, in addition to one-half of Municipal Pier No. 1 at the foot of South Street. These piers cover a frontage of about 760 feet and are short, two being only 90 feet long, three only 100 feet, one 110 feet, one 120 feet, one 130 feet, and one 150 feet. These companies own only the frontage occupied by two of these piers.

Next come the piers occupied by the Baltimore Steam Packet Co. One of these piers is leased from the city and is 140 feet long and 113 feet wide. The other is owned by the company and is 160 feet long and 215 feet wide. Adjoining these piers are two that are owned and occupied by the boats of the Tolchester Beach Improvement Co., next to which are two piers owned and occupied by the Chesapeake Steamship Co. of Baltimore, a subsidiary of the Chesapeake & Ohio Railway, while near at hand are two bulkhead wharves owned and occupied by the New York & Baltimore Transportation Line.

The piers of the Tolchester Line are each 125 feet in length, one being 70 feet and the other 50 feet in width. The piers of the Chesapeake Steamship Co. are, respectively, 180 feet and 325 feet long, and 150 feet and 118 feet wide. The wharves occupied by the New York & Baltimore Transportation Line are solid bulkhead structures which occupy frontages of 88 feet and 280 feet, respectively.

Several steamship lines occupy piers on the north side of the Basin along Pratt Street. Municipal Pier No. 1 is occupied jointly by the steamers of the Baltimore, Chesapeake & Atlantic Railway Co. and the United Fruit Co. Three of the five occupants of Municipal Pier No. 2 are steamship lines, namely, the Atlantic Fruit Co., the Baltimore & Carolina Steamship Co., and Lanassa & Goffe. Municipal Pier No. 3 is occupied exclusively by the vessels of the Merchants & Miners' Transportation Co., while a portion of Municipal Pier No. 5 is leased to the Baltimore Steam Packet Co.

Vessels of the trans-Atlantic lines calling at Baltimore are accommodated at the piers of the Baltimore & Ohio Railroad at Locust Point or at the Canton piers of the Pennsylvania Railroad.

*Canton Co. and other terminals.*—Large tracts of water-front property in the Canton district are owned by the Canton Co. This cor-

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poration, which was organized in 1878 and is apparently independent of railroad control, owns approximately 1,500 acres of land, with a total frontage, measured along pierhead lines, of about 2 miles. Much of this property is leased to industrial concerns, but only a relatively small portion of the water frontage has as yet been developed. The Canton Co. owns the Canton Railroad Co., which operates about 16 miles of tracks that connect the various piers of the company and make direct connections with the Baltimore & Ohio and the Pennsylvania Railroads and indirect connections, by lighters and car floats, with the Western Maryland Railroad.

In the section between Chester Street and Mountford Avenue, which is fairly close to the main business district of Baltimore, the Canton Co. owns approximately 1,000 feet of direct frontage. This frontage is improved by eight piers and six bulkhead wharves. The piers are short and narrow, one being only 20 feet wide and two only 30 feet in width. One pier is used for general wharfage. All of the other piers and all of the wharves are leased to canning and packing concerns. Another stretch of frontage owned by the Canton Co. is located at the foot of Lakewood Avenue and is improved by a timber bulkhead wharf about 540 feet long. This wharf is open to general public use, chiefly for lumber. On the east side of the harbor the company owns two small piers at the foot of Second Avenue and one at the foot of Eighth Avenue.

Beyond Lazaretto Point on the north side of the main channel the Canton Co. owns approximately 1 mile of direct frontage, of which 1,000 feet have been improved by concrete bulkheads. The company has a modern pier 800 feet long and 150 feet wide with a 35-foot depth of water alongside. This pier has a corrugated-iron shed with two railroad tracks extending through the middle and a 6-story reinforced concrete warehouse, 200 feet long and 80 feet wide. On the adjoining bulkheads are two warehouses, one of corrugated-iron construction and the other of frame.

The Baltimore Fidelity Warehouse Co. owns about 9 acres of water-front property near Lazaretto Point with about 1,100 feet frontage, in addition to about 130 feet of frontage at the foot of Battery Avenue on the basin at the head of the northwestern branch. The latter tract is improved by one 6-story warehouse and the former by 23 warehouses. All of the warehouses are of reinforced concrete construction and are six stories in height.

The Terminal Warehouse Co. has a pier at the foot of Bond Street near Brown's Wharf terminal of the Western Maryland Railroad. This pier is 200 feet long and 190 feet wide and has a shed of frame construction in addition to one 6-story brick warehouse.

Large tracts of water-front property are occupied by industrial concerns. Perhaps the most important of these is the Maryland Steel Co., which has a large steel plant at Sparrows Point on the north bank of the Patapsco. The terminals include two pile and timber piers, one 602 feet long and 40 feet wide and the other 704 feet long and 100 feet wide, and one concrete-bulkhead ore dock. The ore dock is used principally for unloading iron ore from vessels and is equipped with two Brown unloading machines, each of which has a capacity of 500 tons per hour.

Seventeen piers are used by chemical and fertilizer companies. Others are used by canning and packing plants, several by ship-

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building and repair companies, and several by retail coal and lumber companies.

**Type of wharf construction.**—Six of the municipal piers are constructed of pile and timber up to the elevation of mean low water, with sheet piers driven back of the face line of the pier and with a stone or reinforced-concrete wall from the mean low water to an elevation of 6 feet above. The remainder of each pier is a solid fill. Three of the municipal piers are of open pile and timber construction, which appears to be the predominant type among the privately owned wharves.

**Port administration.**—The port of Baltimore is under municipal control, the administrative authority being vested in the harbor board, which is the "third subdepartment" of the department of public improvements. The board, which was created by act of the legislature in 1908,[a] consists of five members, appointed by the mayor, subject to the approval of the city council. The act provides that one member, who shall be president of the board and shall be known as the harbor engineer, must be a civil engineer who has had at least five years active practice and has been in responsible charge of work for at least this period.

The president receives an annual salary of $4,000 while the other members serve without pay. They are chosen for terms of four years. One member is selected as secretary. The president is the responsible head of the administration of port affairs and is the only member of the board who devotes his entire time to port administration. All subordinates employed by the board are appointed by the president subject to the approval of the board.

Although the harbor board is strictly a division of the municipal government of Baltimore, its jurisdiction is not confined to that city, but extends to the entire length of the Patapsco River and its tributaries. An act of the legislature passed in 1912 vests in the mayor and city council of Baltimore full power and authority (1) to provide for the preservation of the navigation of the Patapsco River and tributaries; (2) to establish harbor lines; (3) to provide for improving and deepening the river and its tributaries; (4) to make surveys; (5) to erect and maintain, and to authorize the erection and maintenance of, wharves, piers, bulkheads, etc., and to make regulations concerning their condition and use; and (6) to regulate the use of publicly owned water terminals and to rent or lease the same.

A harbormaster and four assistants are employed to enforce regulations regarding the movement of traffic within the harbor and to collect wharfage and other charges. These officials are under the jurisdiction of the city comptroller and receive as compensation one-fifth of all fees collected.

Funds for new construction and improvements have been made from moneys raised by bond issue. Appropriations for maintenance and operating expenses are paid out of the general funds of the city. All revenues from the water-front property of the city are turned into the general funds.

**Port charges.**—*Pilotage.*—Vessels drawing less than 12 feet pay $3.50 per foot draft for pilotage inward or outward; vessels of from

[a] Acts of 1908, chap. 170, sec. 88.

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12 to 15 feet draft, $4 per foot; and vessels drawing 15 feet or over, $5 per foot.

*Towage.*—The charge for towing a loaded vessel from the mouth of the bay to the city ranges from $124 for a vessel of 200 tons to $425 for a 3,000-ton vessel. Towage within the city limits varies from $1.50 to $35 for vessels and from $1.50 to $3.50 for barges.

*Harbor dues.*—No harbor dues are charged at the port of Baltimore.

*Dockage.*—At the municipal piers or wharves that are open to the public use, no charge is made for dockage against any vessel upon which wharfage in excess of $2 per day has been collected. Vessels paying less than $2 per day in wharfage must pay the following rates for dockage:

| | | |
|---|---|---|
| Less than 8 tons | per day.. | $0.50 |
| 8 to 50 tons | do.... | 1.00 |
| 50 to 150 tons | do.... | 1.50 |
| More than 150 tons | per ton per day.. | .01 |

Vessels remaining at any of the municipal piers more than six days pay double the above rates for each additional day up to 12, while those that remain more than 12 days pay treble rates for every day beyond 12.

*Wharfage.*—The following rates of wharfage are assessed on commodities passing over any municipal pier or wharf:

| Commodities. | Wharfage charges per day. | Commodities. | Wharfage charges per day. |
|---|---|---|---|
| Coffee, ginger, pepper, etc....per bag.. | $0.01 | Grain, etc.....per bushel.. | [b] $0.005 |
| Cotton, dry goods, etc.....per bale.. | .04 | Hides and leather.....per 100 sides.. | .30 |
| Flour, sugar, potatoes, onions, etc.....per barrel.. | .01 | Hogsheads and pipes of merchandise.....each.. | .0625 |
| Dry goods, drugs, gums, etc..per box.. | .03 | Nails, shot, raisins.....per keg.. | .01 |
| Raisins, soap, candles, etc.....do.... | .005 | Butter, lard, etc.....do.... | .01 |
| Castings.....per ton.. | .15 | Lumber.....per M feet.. | [c] .15 |
| Carriages, wagons, or carts.....each.. | .125 | Shingles.....per M.. | [c] .05 |
| Coal, plaster, etc.....per ton [a].. | .05 | Lath.....do.... | [c] .03 |
| Sand, gravel, bricks.....per day.. | 2.50 | Firewood.....per cord.. | [c] .20 |
| Crates of ware.....per crate.. | .04 | Posts.....each.. | [c] .01 |
| Dyewoods.....per ton.. | .15 | | |

[a] Ton of 28 bushels for coal.
[b] Maximum.
[c] Ten days' time allowed.

*Switching.*—The following is a list of charges for switching at the port of Baltimore:

| Movement. | Switching charges per 100 pounds. | | | | | |
|---|---|---|---|---|---|---|
| | Class 1. | Class 2. | Class 3. | Class 4. | Class 5. | Class 6. |
| From points on the Pennsylvania R. R. to points on the Baltimore & Ohio R. R.: | | | | | | |
| Local movement | $0.11 | $0.10 | $0.08 | $0.07 | $0.06 | $0.05 |
| Interstate movement | .05 | .05 | .02 | .02 | .02 | .02 |
| Between stations or industries in Baltimore: | | | | | | |
| On Pennsylvania R. R | .06 | .05 | .05 | .04 | .04 | .04 |
| On Baltimore & Ohio R. R | .06 | .06 | .06 | .05 | .05 | .05 |
| On Western Maryland Ry | .06 | .06 | .05 | .05 | .04 | .04 |

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## BRUNSWICK, GA.

The entrance to the harbor at Brunswick is 71 miles south of the entrance to Savannah Harbor.

The harbor includes the improved channel across the bar, St. Simons Sound, Brunswick River, East River to the upper limit of the city, and Turtle River to the Southern Railway dock; also that portion of Academy Creek used by shipping interests. The distance from the city to deep water beyond the bar is 14½ miles.[a]

The controlling depths and minimum widths of the harbor at various points, with mean range of tides, are indicated in the following table:[b]

| Localities. | Mean range of tide. | Minimum width. | Controlling depth at mean low water. |
|---|---|---|---|
| | *Feet.* | *Feet.* | *Feet.* |
| Bar | 6.3 | 250 | 23.1 |
| Brunswick Point | 7.0 | 200 | 21.5 |
| East River | 7.0 | 200 | 21.8 |
| Academy Creek | 7.0 | 150 | 20.0 |
| Lower Turtle River | 7.1 | 300 | 21.5 |
| Upper Turtle River | 7.1 | 300 | 22.3 |

**Railroads.**—Brunswick is served by the Atlanta, Birmingham & Atlantic, the Atlantic Coast Line, the Georgia Coast & Piedmont, and the Southern railroads. These railroads parallel the water front for considerable distances and serve practically all of the wharves. The Atlantic Coast Line Railroad parallels the East River, the Southern Railway serves the Turtle River docks, and the Atlanta, Birmingham & Atlantic Railroad serves the factories on Terrys Creek.

**Steamship lines.**—The principal coastwise line of steamers calling at Brunswick is the Mallory Line, which operates one steamer weekly in each direction between Brunswick and New York.

A number of small local lines also call at Brunswick. Among these are the Brunswick, St. Simons & Darien Steamboat Co., which operates between Brunswick and Darien, Ga.; the Brunswick & Florida Steamboat Co., between Brunswick, Jekyll Island, Cumberland, and Fernandina, Fla.; and the St. Simons Transit Co., between Brunswick and Ocean Pier, Ga.

**Commerce of the port.**—The commerce of the port of Brunswick in the calendar year 1913 amounted to 1,009,026 short tons of freight, valued at $58,258,725. The following table[c] shows the tonnage and value of the trade of the port, classified by general character:

| Class. | Short tons. | Value. |
|---|---|---|
| Foreign: | | |
| Receipts | 16,268 | $128,826 |
| Shipments | 181,882 | 19,750,466 |
| Coastwise: | | |
| Receipts | 59,238 | 24,536,171 |
| Shipments | 570,539 | 8,517,337 |
| Local | 181,099 | 5,325,925 |
| Total | 1,009,026 | 58,258,725 |

[a] Report, Chief of Engineers, U. S. Army, 1914, p. 569.
[b] Idem, p. 572.
[c] Idem, p. 2078.

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The principal exports to foreign countries are cotton, lumber, and naval stores, while the principal imports are fertilizer materials. In the coastwise trade the principal articles are cotton, lumber, and naval stores on the outbound trips and general merchandise on the inbound.

The total commerce, inbound and outbound, in these articles is shown in the following statement for 1914:[a]

| Articles. | Short tons. | Value. | Articles. | Short tons. | Value. |
|---|---|---|---|---|---|
| Coastwise and local: | | | Foreign—Continued. | | |
| Crossties | 137,111 | $760,970 | Cotton | 23,512 | $4,903,753 |
| Naval stores | 26,863 | 1,311,942 | Naval stores | 20,484 | 888,902 |
| Lumber | 119,665 | 1,723,500 | Lumber and lumber products | 35,116 | 261,571 |
| Kainit | 2,068 | 16,544 | Miscellaneous | 2,145 | 27,746 |
| Fertilizer | 4,384 | 117,500 | Total | 90,078 | 6,132,590 |
| Miscellaneous | 87,235 | 28,134,142 | Local lumber | 19,820 | 146,123 |
| Total | 377,326 | 32,064,607 | Grand total | 487,224 | 38,343,320 |
| Foreign: | | | | | |
| Fertilizer materials | 5,769 | 42,898 | | | |
| Salt | 3,052 | 7,720 | | | |

**Extent and ownership of water front.**—Approximately 5 miles of water front are available at the port of Brunswick. The total frontage on all the streams within the port is perhaps 25 miles, but the greater portion can not be economically brought into use at present.

The city of Brunswick owns practically 2 miles of frontage, including street ends, but only 765 feet have been developed for commercial purposes. Railroad companies are said to own 18,340 feet; industrial companies, 4,490 feet; wharf and dock companies, 500 feet; and steamship companies, 270 feet.

**Terminals.**—The United States Army engineer in charge of the improvement of the harbor, reports[b] that—

> Brunswick Harbor has an improved water front of about 3 miles, located on the east side of East River and Academy Creek, including a short wharf, 2,000 feet in length, belonging to the Southern Railway, situated on the east shore of Turtle River. In addition to this wharf, shipping to a limited extent is also carried on from small wharves and landings in Terrys Creek on the northeast side of the city of Brunswick, totalling 1,300 feet. This frontage is made use of by railroad companies, municipal docks, and some private ownerships, the railroads owning 10,700 feet, the greater portion of which is leased to forwarding agents and used for the loading of lumber. Private docks under private ownerships, leased in some instances, take in 5,300 feet.
>
> The city maintains two public docks at the foot of two separate streets, and owns the foot of all its streets, though it has control over only four of them, totalling 255 feet, the rest having been leased to individuals or corporations.

The Atlantic Coast Line Railroad terminals have an improved frontage of 2,800 feet on East River and Academy Creek. These wharves are used chiefly for handling lumber, crossties, and other timber products. These terminals are connected by rail with all the railroads entering and serving the port of Brunswick.

The terminals of the Southern Railway are extensive and include two wharves. One wharf has two large open sheds and two large storage warehouses. The other wharf has six warehouses and two

[a] Report, Chief of Engineers, U. S. Army, 1915, p. 2428.
[b] Special Report of Chief of Engineers, U. S. Army, on Water Terminal and Transfer Facilities (H. Doc. No. 226, 63d Cong., 1st sess.), p. 721.

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large open sheds. The sheds and one large warehouse are used exclusively for handling cotton for export in connection with the Strachan line of steamers.

One large warehouse recently constructed is used for the storage of fertilizer material, salt, cement, etc. This warehouse is 301 feet long, 101 feet wide, and 50 feet high. It is equipped with a mechanical unloading plant consisting of two movable wooden towers, each about 85 feet high, which run on steel rails on the wharf in front of the warehouses. Cargoes are raised from the holds of vessels to the storage bin at the top of the towers by means of buckets of 3,000 pounds capacity which are operated by steam-hoisting engines. From the bin the material is carried into the warehouse by means of small motor cars operating over an elevated track. These cars, which have a capacity of 5,000 pounds each, are electrically operated and are so constructed that they can be dumped quickly.

The terminals of the Atlanta, Birmingham & Atlantic Railroad can be best described in the following extracts from a letter dated August 29, 1912,[a] which has been amended in a few particulars to cover changed conditions:

The Atlanta, Birmingham & Atlantic Railroad terminals are located in the southern portion of Brunswick, north of Oglethorpe Bay, starting at the Brunswick Creosoting Co.'s dock, running in a southerly direction to property of the Southern Railway, and from the water front to what is known as the Boulevard. There are four warehouses on this property, 58 by 400 feet each; one open lumber pier, 140 by 735 feet; one covered shed, 48 by 372 feet; one covered platform, 28 by 353 feet; one covered shed, 48 by 180 feet; and a cotton shed, 150 by 600 feet. There is also located on the terminals an electric light and waterworks. Extensive dredging has been done in Timber Basin and around piers, also considerable bulkheading, and 23 feet of water is being maintained. The terminals are entirely efficient for the business that has been handled. They are not public wharves, but all lines now using same do so on equal terms. They are now being used by the Mallory Steamship Co., operating between New York and Brunswick; the Brunswick, St. Simons & Darien Steamboat Co., between Brunswick and Darien; the Brunswick & Florida Steamboat Co., between Brunswick, Jekyl Island, Cumberland, and Fernandina; the steamer *Atlantic*, operating between Brunswick and Satilla River points; and the Macon Atlantic Navigation Co. This line operates between Brunswick and Macon and intermediate points. There are no berthing charges whatever for vessels using these docks, charges being collected on basis of cargo moving.

Physical connection exists between the terminals and all-rail lines operating from Brunswick.

**Type of wharf construction.**—The United States Army engineer in charge of the improvement of Brunswick Harbor, reports that "all of the wharves are constructed of wood on a wooden pile foundation, with the exception of the terminals of the Atlanta, Birmingham & Atlantic Railroad, which are on concrete pile foundations with concrete bulkheads. The controlling bulkheads at the mouth of their shipping basin are of creosote piling."

**Port administration.**—The port is under the control of the municipality and, nominally, the administrative authority is exercised through a port warden. That office has, however, been vacant for some time. Because of the fact that all of the terminals are privately owned and operated, the port requires no active controlling body or officer.

The municipality has full authority and power to acquire waterfront property, either by purchase or by condemnation, and to con-

[a] Special Report of the Chief of Engineers, U. S. Army, on Water Terminal and Transfer Facilities (H. Doc. No. 226, 63d Cong., 1st sess.), p. 721.

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struct terminals. The power has not yet been exercised, although plans are in contemplation for the construction of a municipal wharf and the creation of a section for industrial sites along the water front.

Port charges.—*Pilotage.*—The following table contains the pilotage charges in force at this port:

| Draft of vessel. | Pilotage charges. | Draft of vessel. | Pilotage charges. | Draft of vessel. | Pilotage charges. |
|---|---|---|---|---|---|
| 6 feet | $16.75 | 12 feet | $43.75 | 18 feet | $93.00 |
| 6½ feet | 18.75 | 12½ feet | 46.75 | 18½ feet | 99.00 |
| 7 feet | 20.25 | 13 feet | 49.25 | 19 feet | 105.00 |
| 7½ feet | 21.75 | 13½ feet | 52.25 | 19½ feet | 111.00 |
| 8 feet | 23.00 | 14 feet | 58.00 | 20 feet | 117.00 |
| 8½ feet | 24.50 | 14½ feet | 67.00 | 20½ feet | 123.00 |
| 9 feet | 26.00 | 15 feet | 71.00 | 21 feet | 129.00 |
| 9½ feet | 27.75 | 15½ feet | 74.00 | 21½ feet | 135.00 |
| 10 feet | 31.75 | 16 feet | 79.00 | 22 feet | 142.00 |
| 10½ feet | 37.00 | 16½ feet | 82.25 | 22½ feet | 160.00 |
| 11 feet | 39.00 | 17 feet | 87.00 | 23 feet | 186.00 |
| 11½ feet | 41.25 | 17½ feet | 89.50 | 23½ feet | 200.00 |

*Towage.*—The following is a list of the prevailing charges for towing per gross ton of vessel:

| Services. | Coastwise. | Foreign. | Services. | Coastwise. | Foreign. |
|---|---|---|---|---|---|
| From sea or sound to— | | | From bay to— | | |
| City and return | $0.15 | $0.25 | City and return | $0.13 | ..... |
| City— | | | Southern Ry. docks and return | .15 | ..... |
| Light | .06 | ..... | From city to sea, loaded | .10 | $0.20 |
| Loaded | .08 | ..... | From Southern Ry. docks to sea, loaded | .13 | .23 |
| Southern Ry. docks and return | .18 | .28 | | | |
| Southern Ry.— | | | | | |
| Light | .08 | .20 | | | |
| Loaded | .10 | .23 | | | |

*Harbor dues.*—No harbor dues are assessed at this port.

*Dockage.*—In general, no charge is made against vessels occupying berths at any of the wharves.

*Wharfage.*—The rates of wharfage are fixed by tariffs on file with the Interstate Commerce Commission.

## CAPE CHARLES, VA.

Cape Charles is a small town located at the extreme southern end of the narrow strip of territory held by Virginia on the eastern shore of Chesapeake Bay. The prominence of Cape Charles as a harbor is due entirely to the fact that it is the terminus of the New York, Philadelphia & Norfolk division of the Pennsylvania Railroad system, which has contributed largely toward the development of the harbor. A large volume of through traffic is carried by means of car floats and steamships between Norfolk and Cape Charles, a distance of 37 miles.

The harbor is described as being "of rectangular shape, about 1,100 feet long by about 600 feet wide, and was artificially dredged in the basin of an almost insignificant creek. It is connected with deep water in Chesapeake Bay by an artificially dredged entrance. * * * Between the harbor and deep water in Chesapeake Bay there are three

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shoals, over one of which the present available depth does not exceed 12 feet. Between these shoals and the ocean the available channel depth is much greater. The average range of tide is about 2.5 feet."[a]

**Railroads.**—This harbor is served only by the New York, Philadelphia & Norfolk Railroad, which has two freight terminals in the port of Norfolk to which freight is carried on car floats from Cape Charles. One of these terminals is at Port Norfolk, on the Portsmouth side of the harbor, where connection is made, through the Belt Line Railroad, with the several trunk-line railroads that enter Norfolk and Portsmouth from the West and South, while the other is located at Norfolk proper and is used for local traffic only.

**Steamship lines.**—The New York, Philadelphia & Norfolk Railroad operates steamers for carrying passengers between Cape Charles and Norfolk and Old Point Comfort. Eleven steamers operated by this company made 8,371 round trips in 1913, and carried 181,879 passengers, while nine barges made 8,418 round trips.[b]

**Commerce of the port.**—Statistics compiled by the United States Army Engineers show that the commerce of this port increased in volume from 1,031,598 short tons in the calendar year 1902 to 3,021,344 short tons in 1913. The value of the commerce in 1913 was $83,278,268. In 1914 the commerce of this port amounted to 2,780,352 short tons, valued at $116,395,251.[c] The principal commodities handled in 1913 and 1914 were as follows:

| Commodities. | Short tons. | | Value. | |
|---|---|---|---|---|
| | 1913 | 1914 | 1913 | 1914 |
| Miscellaneous | 570,701 | 437,599 | $34,642,060 | $87,469,800 |
| Lumber | 1,945,170 | 1,730,158 | 19,451,700 | 8,650,990 |
| Produce | 156,513 | 240,036 | 12,522,040 | 4,800,720 |
| Cotton | 22,769 | 19,824 | 5,464,560 | 1,982,400 |
| Sugar | 55,439 | 67,328 | 3,326,340 | 8,079,360 |
| Machinery | 46,320 | 25,317 | 2,779,200 | 1,265,850 |
| Oils | 77,728 | 89,016 | 2,331,840 | 2,136,384 |
| Pig iron | 100,384 | 63,743 | 1,204,608 | 956,145 |
| Tobacco | 4,387 | 2,689 | 877,400 | 537,800 |
| All other | 41,933 | 104,642 | 678,520 | 515,802 |
| Total | 3,021,344 | 2,780,352 | 83,278,268 | 116,395,251 |

**Extent and ownership of water front.**—As indicated above, the harbor is not extensive and its use is limited almost entirely to through rail-and-water traffic. The length of water front required is therefore small, and all of the present available frontage of commercial value is owned by the New York, Philadelphia & Norfolk Railroad Co.

**Terminals.**—The following description of the terminal facilities of Cape Charles appeared in the special report on Water Terminal and Transfer Facilities[d] prepared under the direction of the Chief of Engineers, United States Army:

Along the north side of the harbor there is a concrete, sheet-pile wharf, which is used by the railroad company's passenger steamers for landing passengers, baggage, and freight. It is also in use by various small vessels bringing fish, oysters, and truck. Nearly all of the cargo landed at this wharf by these small boats is for ship-

[a] Report, Chief of Engineers, U. S. Army, 1914, p. 455.
[b] Idem, p. 1938.
[c] Idem, p. 1938; idem, 1915, p. 2320.
[d] Issued in 1913 as House Document No. 226 (63d Cong., 1st sess.).

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ment by the railroad, but it is understood that small boats are permitted, without charge, to make use of this wharf for the landing or loading of freight consigned to the merchants and others in the town, subject to the condition, however, that all of the merchandise landed must be removed before the boat leaves the dock.

At the east end of the harbor there are two large transfer slips which are used by the large car floats in loading and discharging freight cars.

At the east end of the south side of the harbor there is a small coal wharf belonging to the railroad company, the remainder of this side of the harbor being taken up by an old bulkhead. Boats are allowed to tie up here without charge and to load and unload their cargo, but everything loaded or unloaded at this point has to be hauled to or from the town over a bad road, a distance of approximately 1 mile, and up a steep grade over the railroad tracks.

**Type of wharf construction.**—As indicated above, the principal wharf is of concrete and sheet-pile construction.

**Port administration.**—This subject is one of no importance for a port whose terminal facilities and commerce are held by one set of private interests and whose population is small.

**Port charges.**—Because of the fact that Cape Charles is almost exclusively a point for transferring through freight from rail to car float the subject of port charges at this place is one of no importance.

## CHARLESTON, S. C.

Charleston is situated on Charleston Bay, at the confluence of the Cooper and Ashley Rivers, about 7½ miles from the ocean. In several ways the situation of Charleston resembles that of New York City, the Cooper corresponding in location to the East River and the Ashley to the Hudson River. The city is reached by an improved channel with a depth of 28 feet at low water and a width of 600 feet between the jetties at the entrance and of 1,000 feet inside. The mean range of tide is 5 feet.[a]

The Cooper River, which constitutes the principal section of the harbor and is on the eastern side of the peninsula on which the city is located, is navigable for vessels of 26-foot draft to the navy yard, which is over 6 miles above the southernmost point of the city, and for 7 miles beyond. A vessel drawing 15 feet has been loaded on the Cooper River at Strawberry, a point 22 miles north of the navy yard.[b]

Ashley River is on the western side of the city, and in this river a new channel, 240 feet wide and 20 feet deep at mean low water, is now being dredged. This channel will extend from the main channel to the wharves of the fertilizer plants, a distance of about 6 miles.

**Railroads.**—The city of Charleston is served by the Atlantic Coast Line Railroad, the Seaboard Air Line Railway, and the Southern Railway, all of which have water terminals in the city. Upon the completion of the coal terminals of the Carolina, Clinchfield & Ohio Railroad, Charleston will also be served by that railroad.

The Charleston Terminal Co. operates, along the Cooper River front, a marginal railway which intersects all the railroads that enter the city and serves the principal wharves and warehouses on the Cooper River.

The entire capital stock, $200,000, of the Charleston Terminal Co. is owned jointly by the Atlantic Coast Line Railroad and the Southern Railway. These railroads have entered into an agreement with the Charleston Terminal Co. by which they undertake to turn over to the Charleston Terminal Co. for terminal handling all their traffic

[a] Report, Chief of Engineers, U. S. Army, 1914, p. 539.
[b] Coast Pilot (U. S. Coast and Geodetic Survey), Atlantic Coast, sec. D., p. 71.

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in carload lots moving to or from wharves, warehouses, and industries and to pay for such services such allowances as will suffice to yield to the Charleston Terminal Co., with its other income, a revenue sufficient to meet the interest upon its first-mortgage 4 per cent bonds, guaranteeing, in case of a deficiency, to make good the same in equal contributions, half and half.[a]

The Charleston Terminal Co. owns 1.52 miles of main track and 11.65 miles of sidings and spurs. It operates four locomotives. The general balance sheet of this company on June 30, 1914, showed that it had a property investment of $959,811, and there was outstanding, in addition to $200,000 in capital stock, a funded debt of $800,000.[a]

The Seaboard Air Line Railway has recently secured a direct entrance to the city of Charleston by the acquisition of the Carolina, Atlantic & Western Railway, which is known locally as the Bonsal Lines and is a comparatively new railroad with 202 miles of main track and about 22 miles of sidings.

**Steamship lines.**—The principal steamship lines calling regularly at Charleston are engaged in the coastwise trade. The most important of these is the Clyde Steamship Co., which has about 18 sailings a month, in each direction, between New York, Charleston, and Jacksonville, and about the same number per month between Boston, Charleston, and Jacksonville. During the greater portion of 1914 the Philadelphia & New Orleans Transportation Co. maintained several sailings per week between Philadelphia, Charleston, Tampa, and New Orleans. During the present year, 1915, the ships of this company have been engaged in the export cotton trade from other ports. The Baltimore & Carolina Steamship Co. operates a freight service with one sailing per week in each direction between Baltimore, Georgetown, S. C., and Charleston.

Recently another coastwise line, the American-Hawaiian Steamship Co., has begun to call at the port of Charleston, but only on the eastbound trip. The steamers of this line call at Charleston under the present schedule about once in every 20 days.

**Commerce of the port.**—The total water-borne commerce handled over the wharves of Charleston amounted to 1,043,058 short tons, valued at $79,225,772, in the calendar year 1913, and to 919,184 short tons, valued at $46,800,741 in the calendar year 1914.[b] The coastwise trade formed more than two-thirds of the value, as is indicated in the following tabular statement:

| Class. | Short tons. | | Value. | |
|---|---|---|---|---|
| | 1913 | 1914 | 1913 | 1914 |
| Coastwise trade: | | | | |
| Inbound | 351,598 | 320,037 | $22,040,417 | $16,565,175 |
| Outbound | 230,295 | 210,758 | 31,040,699 | 18,907,624 |
| Total | 581,893 | 530,795 | 53,081,116 | 35,472,799 |
| Foreign trade: | | | | |
| Imports | 380,602 | 332,729 | 5,361,341 | 4,897,698 |
| Exports | 80,563 | 55,660 | 20,783,315 | 6,430,244 |
| Total | 461,165 | 388,389 | 26,144,656 | 11,327,942 |
| Grand total | 1,043,058 | 919,184 | 79,225,772 | 46,800,741 |

[a] Poor's Manual of Railroads, 1915, p. 593.
[b] Report, Chief of Engineers, U. S. Army, 1914, pp. 2049–2050; idem, 1915, p. 2405.

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The foregoing statement shows also that the inbound tonnage in the year 1913, which was the more nearly normal trade year, and, therefore, is preferable for purposes of discussion, was 732,200 short tons, while the outbound was only 310,858 short tons. The outbound traffic, however, was far more valuable, its value being $51,824,014, as compared with $27,401,758 for the inbound traffic. The foreign imports were large in quantity, but their value was small. Fertilizer materials constituted practically all of the foreign commodities imported into Charleston. These materials are used by the numerous fertilizer factories located on the Ashley River and at interior points.

The foreign exports consist almost entirely of cotton. Of the total value of exports, $20,783,315, in 1913, all except $60,543 was attributable to cotton. Charleston was formerly the chief shipping point for naval stores, but that industry has moved farther south, and in 1913 naval stores to the value of only $65,060 were shipped from Charleston, $61,000 to foreign and $4,060 to coastwise points.

In the coastwise trade the inward and outward movements are better balanced than in the foreign, with respect both to the tonnage and to the character of cargo handled. Of the total value of inbound coastwise trade, $22,040,417, "miscellaneous," or general merchandise, constituted more than 80 per cent. Next in importance were petroleum products, valued at $1,056,458; cement, lime, etc., valued at $801,550; and miscellaneous fertilizer materials valued at $741,000.

In the outbound coastwise movement cotton goods and raw cotton were the principal articles shipped, as is indicated in the following summary:

| Commodities. | Short tons. | | Value. | |
|---|---|---|---|---|
| | 1913 | 1914 | 1913 | 1914 |
| Cotton goods | 26,989 | 12,762 | $21,591,200 | $10,209,600 |
| Cotton: | | | | |
| Sea-island | 1,506 | 641 | 903,600 | 432,675 |
| Upland | 23,871 | 19,939 | 6,025,443 | 3,987,800 |
| Lumber and timber products | 157,172 | 130,756 | 1,406,384 | 1,312,794 |
| All other | 20,757 | 46,660 | 1,114,072 | 2,964,755 |
| Total | 230,295 | 210,758 | 31,040,699 | 18,907,624 |

With the completion of the Southern Railway coal pier and that of the Clinchfield Coal Co., which, it is expected, will be built during 1915, it is believed that a large export as well as coastwise trade in coal will be handled at Charleston.

**Extent and ownership of water front.**—The United States Army engineer at Charleston reported in 1913 that the length of the water front from the upper wharf on Cooper River down that river along Shipyard Creek and up Ashley River to the upper wharf on that river was 15½ miles. The water front on both rivers within the city limits is about 7 miles long. Beyond the city limit on Ashley River there are about 2 miles of water front and on the Cooper River and Shipyard Creek about 6½ miles.[a]

[a] Special Report of Chief of Engineers, U. S. Army, on Water Terminal and Transfer Facilities (H. Doc. No. 226, 63d Cong., 1st sess.), p. 709.

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The frontage on the west bank of the Ashley River, where there is now nothing but marsh, and on Drum Island in the Cooper River, which is now mainly marsh, is not included in the above figures.

Of the water front within the city limits the municipality owns a large tract at the Battery, which is at the southern extremity of the city, and five parcels on the Ashley River. These tracts have an aggregate frontage of over 6,500 feet, but all of them are held solely for park or boulevard purposes. The city owns no frontage available for wharves or docks, but has, it is said, a verbal agreement with the Charleston Terminal Co. whereby it can obtain about 800 feet fronting on the Cooper River.

The great bulk of the frontage on the Cooper River within the city limits is owned by the Charleston Terminal Co., the Southern Railway, the Atlantic Coast Line Railroad, the Seaboard Air Line Railway, and the Carolina, Clinchfield & Ohio Railway.

On Cooper River and Shipyard Creek beyond the city limits, the major portion of the frontage is owned by the United States and is used for the navy yard or is a part of the naval reservation. Above the navy yard, several industrial plants have recently been established on the river front.

Comparatively little of the frontage on Ashley River within the city limits is actually used, but above the city limits a long and continuous stretch of water front is held by 12 fertilizer factories, all of which have wharves for receiving imported fertilizer materials.

**Terminals.**—The city of Charleston has at present no improved water frontage, but has given some consideration to the advisability of providing municipal terminals. The principal drawback is understood to be the small extent of the city's borrowing power. The city has a "gentlemen's agreement" with the Charleston Terminal Co. whereby the city has the first option to purchase at a fair price the frontage occupied by the Adgers North and South Wharves and Commercial Wharf. These wharves are located near the main business center of the city and have a total frontage of 800 feet.

The principal terminals at this port are those of the Charleston Terminal Co. This company holds the major portion of the improved frontage on the Cooper River within the limits of the city. Its properties include the Columbus Street terminals, Adgers North and South Wharves, Commercial Wharf, the property of the Charleston Compress & Wharf Co., and the Washington Street warehouses.

The most important terminals are those at Columbus Street, which cover a river frontage of 3,350 feet and have a continuous improved wharf frontage of 2,250 feet. These terminals are provided with five sheds, three of which are 300 feet long and 75 feet wide, and two are 400 feet long and 75 feet wide. These sheds are used primarily for the handling and storage of fertilizer materials, such as kainit and other potash salts, nitrate of soda, pyrites, and guano. The piers are equipped with towers for unloading these materials from vessels lying at the wharf and also with overhead tram systems for conveying the materials into the warehouses.

Adgers North and South Wharves and Commercial Wharf occupy a total frontage of 800 feet. These wharves are not being used by the Charleston Terminal Co., but are chiefly used, free of charge, as landings by small craft operating on the adjacent island waterways.

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Adjacent to these wharves are brick warehouses, with an aggregate floor area of approximately 140,000 square feet, which are used by the terminal company for the storage of cotton.

The Charleston Compress & Wharf Co. property is not operated by the terminal company, but is leased to the Maybank Cotton Co. This property occupies a frontage of approximately 450 feet and has three piers, several large brick warehouses, and two cotton compresses.

The Washington Street warehouses of the terminal company are located a short distance back from the water front and are used for the storage of cotton. There are two warehouses, each of which is 600 feet long and 130 feet wide, and has a floor area of 78,000 square feet. The wharves, piers, sheds, and warehouses of the terminal company are fully provided with spur and switching tracks which connect with the main tracks operated by the company.

*Southern Railway terminals.*—The Southern Railway has four general merchandise piers and one coal pier. The following are the approximate dimensions of the general merchandise piers: No. 1, length 400 feet, width 115 feet; No. 2, length 435 feet, width 65 feet; No. 3, length 450 feet, width 100 feet; No. 4, length 450 feet, width 85 feet. Two piers are leased to the United Fruit Co. and to the Southern Steamship Co. Another is used for discharging fertilizer materials and another for the shipment of vegetables. These piers are in poor condition and are not in active use. One reason, perhaps, for the failure of the Southern Railway to make a greater use of these piers lies in the fact that it is a part owner of the Charleston Terminal Co.

The Southern Railway Co. has recently completed the construction of a coal pier, the first of its kind at Charleston. This pier is located on the Cooper River north of Belvidere Creek, at which point the Southern Railway owns 120 acres of water-front property with more than 4,000 feet of frontage. This pier will be used for shipping soft coal, principally from the coal fields of Virginia, and has been equipped with modern handling machinery. The following is a description of the equipment of this pier, which appeared in Manufacturer's Record of September 17, 1914:

> This plant will consist essentially of a movable loading tower and a movable car dumper mounted on tracks located on the coal pier. The tracks for the loading tower will be located on the top of the pier. The car dumper will be carried on a steel trestle and will be designed to travel lengthwise of the dock a distance of approximately 300 feet. This trestle upon which the car dumper travels will be of sufficient height to elevate the rails of the car dumper approximately 17 feet 8 inches above the top of the dock. The loading towers will be designed to travel along the dock a distance of 300 feet opposite the car-dumper trestle. The yard tracks for the road cars will be carried on trestles which will form a continuation of the car-dumper trestle, and in operation the loaded cars will be brought from the storage yards to the car dumper by means of a yard locomotive. The locomotive will spot the loaded cars on the cradle of the car dumper, which has first been placed in a position opposite the loading tower. The car dumper will rotate the car, discharging the contents into a receiving hopper on the loading tower, and this receiving hopper will in turn discharge the coal onto a steel flight conveyor carried on a boom attached to the tower. This conveyor will transfer coal to its outer end, which terminates in a telescopic chute extending through the hatch opening into the cargo hold. The car dumper is capable of handling 30 cars per hour.

*Atlantic Coast Line Railroad terminals.*—The Atlantic Coast Line Railroad has two terminals which, like those of the Southern Railway, are not in active use and are in rather poor condition. This railroad shares with the Southern Railway the ownership of the Charleston



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Terminal Co., which is equipped to handle most of the traffic of the Atlantic Coast Line that might otherwise go to its own terminals. Moreover, these railroads have entered into an agreement with the Charleston Terminal Co. whereby they obligate themselves to furnish enough traffic at appropriate rates to enable the terminal company with its other income to pay the interest on its bonds or to make good any deficiency that may occur therein.

*Other railway and steamship terminals.*—The terminals of the Carolina, Atlantic & Western division of the Seaboard Air Line Railway adjoin those of the Southern Railway and include a recently constructed pier 800 feet long and 175 feet wide. An extension 20 feet wide and 127 feet long has been built at right angles to the outer end of the pier, which provides a berthing space of 302 feet at the end of the pier. A one-story warehouse 765 feet long and 100 feet wide has been erected on the pier for the storage of fertilizer materials in bulk. One railroad track extends on either side of the pier, which is equipped with towers for unloading bulk cargoes from vessels and with an overhead conveyor system for conveying materials into the warehouse or for discharging into freight cars below.

In the rear of this pier are the tracks of the Charleston Terminal Co. and a warehouse and freight depot of the Seaboard Air Line Railway.

The newest terminals at Charleston are those of the Clyde Steamship Co. The terminal property was bought from the Charleston Terminal Co. and has a frontage of 1,000 feet, only one-half of which has been improved. The company has three piers, each 452 feet long and of creosoted pile and timber construction. Pier No. 1 is 112 feet wide and has a slip on one side and two tracks on the other. Piers Nos. 2 and 3 are each 274 feet in width and were built as a unit, with a slip on either side and four tracks in the center.

None of the other regular lines of steamships that operate from Charleston owns its own terminal. The United Fruit Co. uses the terminals of the Southern Railway; the American-Hawaiian Steamship Co., the Baltimore & Carolina Steamship Co., and the Philadelphia & New Orleans Transportation Co. use the wharves of the Charleston Terminal Co.

The Holstein Corporation, which is controlled by the Carolina, Clinchfield & Ohio Railroad Co., owns a tract of 181 acres fronting on Town Creek and the whole of Drum Island, which contains about 352 acres. The frontage on Town Creek, which is practically a part of Cooper River, is 1,900 feet; the frontage on Drum Island, which lies opposite, is about 4 miles. The company is now engaged in developing its holdings on the mainland. The land, much of which was recently marsh, is now being filled in. The original plans of the company called for the construction of an extensive coal terminal, but these have since been modified because of conditions produced by the war in Europe. Instead of a steel-and-concrete dock a pile-and-timber structure will probably be erected.

**Port administration.**—The administration of the port of Charleston is vested in a board of harbor commissioners consisting of 13 members, as follows: The mayor, the presidents of the chamber of commerce, the cotton exchange, and the merchants' exchange, a member of the executive committee of the State board of health, and eight other residents of the city of Charleston who are appointed by the

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governor. The members of the board of harbor commissioners are also commissioners of pilotage for the port of Charleston. Apparently the principal work done by the board is in examining and licensing pilots, since the city of Charleston owns no water front used for terminals.

Although the board of harbor commissioners, as commissioners of pilotage, examine, license, and regulate pilots, they have no control over the rates of pilotage, those rates being fixed by State law. The board of harbor commissioners has power to make rules for the regulation and government of vessels at the port. The board has power also "to fix the lines for said bay and harbor and rivers and creeks within which riparian owners may erect wharves, docks, and other proper erections and fixtures for commercial, manufacturing, and other purposes. The said board, or a majority of them, shall be authority to cause the removal of any wharf, dock, or other obstruction to navigation, that may, in their opinion, be injurious to such bay, harbors, rivers, or creeks." The harbor master and the port wardens are appointed by the harbor board.

**Port charges.**—*Pilotage.*—The rates of pilotage, as fixed by act of the State legislature, are as follows:

| Draft of vessel, etc. | Pilot charges. | Draft of vessel, etc. | Pilot charges. | Draft of vessel, etc. | Pilot charges. |
|---|---|---|---|---|---|
| 6 feet or less | $14.00 | 18–19 feet | $82.00 | 27–27½ feet | $204.00 |
| 7–8 feet | 16.50 | 19–20 feet | 92.00 | 27½–28 feet | 210.00 |
| 8–9 feet | 18.50 | 20–21 feet | 100.00 | 28–28½ feet | 216.00 |
| 9–10 feet | 21.00 | 21–22 feet | 112.00 | 28½–29 feet | 222.00 |
| 10–11 feet | 27.00 | 22–23 feet | 128.00 | 29–29½ feet | 228.00 |
| 11–12 feet | 32.00 | 23–24 feet | 146.00 | 29½–30 feet | 234.00 |
| 12–13 feet | 36.50 | 24–24½ feet | 168.00 | 30 feet | 240.00 |
| 13–14 feet | 41.00 | 24½–25 feet | 174.00 | Piloting around Ashley or Cooper Rivers | 8.00 |
| 14–15 feet | 50.00 | 25–25½ feet | 180.00 | Detention per day | 4.00 |
| 15–16 feet | 57.50 | 25½–26 feet | 186.00 | Docking and streaming | 4.00 |
| 16–17 feet | 64.50 | 26–26½ feet | 192.00 | | |
| 17–18 feet | 73.50 | 26½–27 feet | 198.00 | | |

*Harbor dues.*—The following harbor dues are assessed at Charleston port:

| Class of vessel. | Dues per trip. | Class of vessel. | Dues per trip. |
|---|---|---|---|
| Coastwise: | | Foreign: | |
| Steamship | [a] $6.00 | Steamship | $12.00 |
| Schooner | 2.00 | Bark | 6.00 |
| Brig | 2.50 | Brig | 3.00 |

[a] Per month.

*Dockage.*—No charge is made against a vessel for the privilege of docking at any of the wharves at Charleston.

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*Wharfage.*—The following is a table of wharfage charges assessed by the Clyde Steamship Lines on shipments originating at Charleston, S. C.:

| Commodities. | Wharfage rate. | Commodities. | Wharfage rate. |
|---|---|---|---|
| Cotton.....per bale.. | $0.04 | Pitch.....Per barrel.. | $0.03 |
| Cotton seed.....per ton.. | .25 | Rice, in socks, barrels, or drums, per 100 pounds..... | .01 |
| Fertilizers.....do.... | .25 | Rosin.....per barrel.. | .03 |
| Iron: | | Shingles.....per 1,000.. | .125 |
| Pig.....do.... | .25 | Spokes.....per 1,200.. | .15 |
| Scrap.....do.... | .25 | Staves: | |
| Laths.....per 1,000.. | .07 | Pipe or hogshead.....do.... | .30 |
| Lumber.....per 1,000 feet.. | .25 | Barrel or cask.....do.... | .20 |
| Meal, cottonseed.....per ton.. | .25 | Tar.....per barrel.. | .03 |
| Oils: | | Turpentine.....do.... | .03 |
| Cottonseed.....per barrel.. | .03 | | |
| Pine.....do.... | .03 | | |
| Rosin.....do.... | .03 | | |
| Tar.....do.... | .03 | | |

In the case of tramp steamers loading cotton or discharging fertilizer materials wharfage is collected on the cargo.

## JACKSONVILLE, FLA.

Jacksonville is located on the west bank of the St. Johns River 27.5 miles from the ocean. The entrance to this river is 122 miles from the entrance to the Savannah River. When work on the present project is completed, the channel from the bar to the city will be 30 feet deep and 300 feet wide, with a width of 600 feet at the bends and through the jetties. On June 30, 1914, more than half of the work called for by the plans for improvement was completed, and the maximum draft that could be carried through the channel at mean low water was 22.5 feet, shoaling at one point having occurred.[a] The mean range of tide at the entrance to the river is 4.5 feet, and at Jacksonville 0.9 foot.

St. Johns River is notable for its width and depth of water, but there are several sharp bends which will probably require elimination before larger boats than those now using the port can conveniently navigate the river.

Railroads.—Jacksonville is served by the Atlantic Coast Line, the Florida East Coast, the Georgia, Southern & Florida, the Seaboard Air Line, and the Southern Railroads.

The St. Johns River Terminal Co. operates a marginal railway that has direct connection with the several railroads that enter the city and with most of the wharves and piers along the most active section of the water front. This company, which was incorporated July 18, 1901, under the laws of Florida, acquired the tracks, wharves, terminal facilities, etc., of the Atlantic, Valdosta & Western Railway Co. It is controlled by the Southern Railway Co. through ownership of the entire capital stock of $100,000. The line operated by this company extends from Bay Street, in Jacksonville, to Grand Crossing, Fla., a distance of 7.66 miles, and includes 24.5 miles of sidings. The company owns five locomotives and two road cars. The general balance sheet of this company on June 30, 1914, showed a property

[a] Report, Chief of Engineers, U. S. Army, 1914, pp. 584-587.

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investment of $1,263,111, and in addition to the capital stock, a funded debt outstanding of $1,200,000. [a]

The municipal terminals now under construction will be connected with the tracks of the Seaboard Air Line, the Atlantic Coast Line, and the Southern Railroads by a short municipal terminal railway extending 7,375 feet from the municipal piers. The board of port commissioners plan to extend the tracks of this line to other docks and to industrial plants when conditions warrant such extension.

**Steamship lines.**—The following is a list of the coastwise and local lines of steamers that call regularly at the port of Jacksonville:

| Lines. | Sailings. | Ports of destination. |
|---|---|---|
| Coastwise lines: | | |
| Clyde Steamship Co.[a] | 1 weekly | Charleston, S. C., and Boston. |
| | 3 weekly | Charleston, S. C., and New York. |
| Merchants & Miners' Transportation Co.[a] | do | Savannah and Baltimore. |
| Do | 4 weekly | Savannah. |
| Local lines: | | |
| Beach & Miller Line[a] | 3 weekly | Crescent City, Fla.[b] |
| Canal Packet Co.[c] | 1 weekly | Daytona, Fla. |
| | do | Eau Gallie and Daytona, Fla. |
| Clyde St. Johns River Line[a] | 1 daily except Sunday | Sandford, Fla. |
| Howard Transportation Co.[a] | 3 weekly | St. Augustine, Fla. |
| | 2 weekly | Daytona, Fla. |
| Independent Line[a] | 1 daily | Green Cove Springs, Fla. |
| Miami Steamship Co | 2 weekly[d] | Miami, Fla. |

[a] Freight and passenger.
[b] Also intermediate landings.
[c] Freight only.
[d] One boat carries freight only, while the other carries both freight and passengers.

In addition to the above-mentioned lines, an unattached boat carrying freight, passengers, and mail, makes trips daily between Jacksonville and Mayport, Fla.

**Commerce of the port.**—The foreign trade of the port of Jacksonville is comparatively small. Its coastwise trade, however, is extensive.

The commercial statistics compiled by the United States Army engineer stationed at this port show that the water-borne traffic at Jacksonville amounted to 2,562,043 short tons, valued at $71,244,501, for the calendar year 1913, and to 2,186,678 short tons valued at $60,718,452 for 1914. In 1913, which was the more nearly normal trade year and is, therefore, preferable for purposes of discussion, the principal specified item was "miscellaneous," or general merchandise, the value of which, $48,483,184, was more than two-thirds of the total value. Most of this "miscellaneous" freight consists of dry goods, groceries, hardware, and similar merchandise brought in from north Atlantic ports by wholesale dealers and jobbers in Jacksonville.

Next in value in 1913 was lumber and ties, the value of which was $10,613,100 and the quantity 1,193,974 short tons, practically all of which was shipped to north Atlantic ports. In the immediate vicinity of Jacksonville the lumber industry is of great importance. Oils, crude, creosote, and "miscellaneous" to the value of $4,779,972 constituted an item of large value in the commerce of 1913, as is

[a] Poor's Manual of Railroads, 1915, p. 1603.

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indicated in the following table showing the quantity and value of the commodities that comprised the commerce of the port in the calendar years 1913 and 1914:[a]

| Commodities. | Short tons. | | Value. | |
|---|---|---|---|---|
| | 1913 | 1914 | 1913 | 1914 |
| Miscellaneous | 706,932 | 342,612 | $48,483,184 | $27,884,960 |
| Lumber and ties | 1,193,974 | 818,595 | 10,613,100 | 5,457,300 |
| Oils | 153,292 | 358,706 | 4,779,972 | 10,894,744 |
| Grain and hay | 103,355 | 37,838 | 3,100,365 | 1,189,140 |
| Fertilizer materials | 74,679 | 133,555 | 1,180,145 | 5,342,200 |
| Steel rails | 33,959 | ..... | 1,018,770 | ..... |
| Coal | 140,300 | 192,833 | 841,800 | 867,750 |
| Phosphate | 110,293 | 58,674 | 551,465 | 293,370 |
| Naval stores | 8,409 | 63,071 | 338,238 | 2,617,508 |
| Cement | 25,250 | 31,300 | 275,062 | 265,125 |
| Salt, lime, and plaster | 11,600 | 39,000 | 62,400 | 351,000 |
| All other | ..... | 110,494 | ..... | 5,555,355 |
| Total | 2,562,043 | 2,186,678 | 71,244,501 | 60,718,452 |

**Extent and ownership of water front.**—At the present time the deep-water frontage available at the port of Jacksonville is approximately 5 miles. Of this frontage the city of Jacksonville owns 3,500 feet in one continuous strip and will soon acquire 700 feet adjoining these holdings, which are at the northeastern limit of the city and lie partly within and partly beyond the city limits.

The Clyde Steamship Co. owns 1,200 feet frontage and the Merchants & Miners' Transportation Co. 690 feet.

The Atlantic Coast Line Railroad owns two tracts of water-front property, one near the business center of the city and the other near the northeastern limit of the city about 2 miles nearer the ocean. The latter tract is the site of the export terminals of this railroad and has a river frontage of about 4,200 feet and an area of approximately 284 acres. The shore line of this property is from 800 to 900 feet within the proposed port warden line and the tract could, therefore, be greatly extended by filling.

The other tract owned by the railroad has a frontage, measured along harbor lines, of approximately 1,000 feet. Although this property is close to the main business district of the city and adjoins the station, it is not actively used and only a portion has been improved for commercial purposes.

The Seaboard Air Line Railway also has extensive holdings of water-front property, including a tract with a direct frontage of about 2,400 feet adjoining the terminals of the Merchants & Miners' Transportation Co.

The water-front property of the St. Johns River Terminal Co. is approximately 600 linear feet within the city limits and about 1,800 feet beyond the city limits.

Much of the river front is occupied by various industrial plants, most of which require water frontage. Among these plants are three fertilizer works, which occupy a large frontage, a marine ways and ship building yard, a creosote works, one sawmill, two oil companies, one bag factory, and several coal yards. Most of these

[a] Report, Chief of Engineers, U. S. Army, 1914, p. 2093; idem, 1915, p. 2442.

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plants, it should be noted, are somewhat removed from the business section of the city and thus do not occupy frontage which is more valuable for commercial than for industrial purposes.

Nevertheless, much of the river frontage near the business center of Jacksonville is inactive or is used for purposes not directly requiring water frontage. This is particularly true of some of the best frontage. Thus, at the foot of Hogan Street the Union Brick Co. wharf is unused and part of it has fallen into the river. At the foot of Laura Street a wharf is occupied by the Seminole Motor Co. as a garage. The next wharf to the east is occupied by the S. B. Hubbard Co., wholesale hardware dealers, as a warehouse. The next wharf, that of the Buick Auto Co., is used for a garage.

A considerable portion of the frontage held by the railroads is also not in active use. The Seaboard Air Line and Atlantic Coast Line Railroads both own large tracts of land abutting on the river, much of which is used to only a small percentage of its possible capacity. It should be said, however, that the terminals of the steamship lines and of the industrial plants handle the great bulk of the trade of the port, which leaves little for the railroad terminals.

**Terminals.**—The city of Jacksonville has proceeded in real earnest to secure a system of municipal wharves. First it was necessary to get the required authority from the State, and this was secured at a special session of the legislature, which was called in 1912 for the express and sole purpose of passing such enabling legislation. The entire expense of the session was borne by the Board of Trade of Jacksonville.

On January 21, 1913, a special election was held to decide upon a bond issue of $1,500,000 for municipal docks, terminal railway, etc. The bond issue was approved by the voters in that election. After a number of months spent in considering various sites, the present property was decided upon, largely because it could be obtained much more cheaply than any other, could be improved at much less expense, and could be connected easily by a short line of railroad with the three principal railroads entering the city (Atlantic Coast Line, Seaboard Air Line, and Southern).

The site chosen has a frontage of 4,200 feet and a depth of 700 feet. Between the old shore line and the bulkheads that have been put in, about 100 acres of land have been made. In addition, the city has acquired by purchase a tract of land 600 feet wide extending a distance of nearly 2,350 feet west from Talleyrand Avenue, a broad marginal thoroughfare paralleling the water front. On this tract the port commissioners plan to leave a strip 100 feet wide for the right of way for the terminal railroad and a large area for freight yards. A cotton warehouse of reinforced concrete construction, 100 feet wide and 420 feet long, has been contracted for and work has been begun, while foundations for two cotton compresses are already built, one being of the latest high density type. Space for a naval stores yard has also been set aside.

The plans of the port commissioners call for six piers, each 1,000 feet in length and 260 feet wide, with the slips between the piers also 260 feet wide. The piers will extend into the river at an angle of 60°. They will be solid sand-filled structures 200 feet wide with retaining wall or bulkhead of steel interlocking sheet piling, and on each side

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there will be a 30-foot fender wharf built on creosoted piling. Two piers are now being constructed and will probably be completed before the close of 1915. It is planned to build two steel warehouses on each pier, each structure to be 800 feet long and 73 feet wide, with two or more tracks in the space between the warehouses and one track on each side of the pier. Modern handling equipment will be installed on the piers.

The piers will be provided with an adequate number of tracks that will connect with the municipal belt railway. This railway will extend from the piers a distance of 7,375 feet to a point where the tracks of the three principal railroads, the Atlantic Coast Line, the Seaboard Air Line, and the Southern adjoin or are close together. A right of way 100 feet wide has been secured, which will allow for future development, and the work of building the line was, on September 1, 1915, about 60 per cent completed.

The most important terminals now in use are those of the Clyde Steamship Co. and the Merchants & Miners' Transportation Co. The terminals of both companies are well located, well constructed, and efficient.

In 1911 three modern piers with large sheet-iron pier sheds were erected on the property of the Clyde Line. Formerly there were two other piers, but one was destroyed by fire and the other has fallen into disrepair and is no longer in use.

Pier 1 is about 100 feet wide and approximately 440 feet long. It faces on one side a slip 100 feet wide and on the other a slip 200 feet in width. On it is a sheet-iron shed, which has two tracks running through the center. This warehouse is used for general cargo.

Pier 2, which is 150 feet wide and 400 feet long, lies between slips 200 feet wide. On this pier has been erected a sheet-iron shed which has tracks in the center and one track on either side. This warehouse also is used for general cargo.

Pier 3 is about 110 feet wide and 400 feet long on one side and 450 feet on the other. Between this pier and the only one of the old piers still standing is a stretch of water having a width of about 350 feet. Pier 3 is improved by a sheet-iron shed with tracks in the center and on either side and is used exclusively for lumber and timber shipments.

Pier 4, the old pier, is about 90 feet wide and 360 feet long. A sheet-iron shed stands on this pier but, like the pier itself, is no longer in use.

The sheds on the three modern piers are all 416 feet in length and are, respectively, 92 feet, 142 feet, and 112 feet in width. They are of timber construction with sheathing of galvanized iron and form practically one structure, since they extend back to the street and cover the bulkheads at the head of the two slips.

The terminal property of the Merchants & Miners' Transportation Co. lies two blocks east of the easterly limit of the Clyde Steamship Co. terminals and adjoins on the west the lumber export terminals of the Seaboard Air Line Railway. This property has one pier 787 feet long and 225 feet wide and two pier sheds, each 646 feet long and 65 feet wide. Between the pier sheds are two tracks served by the Seaboard Air Line Railway.

The principal terminals of the Atlantic Coast Line Railroad are located near the northeastern limits of the city. They are generally referred to as the "export terminals" of the company and have a frontage of about 4,200 feet. Of this frontage approximately 3,400 feet have been improved with piers and wharves. The piers, two in number, are about 400 feet long and 100 feet wide. The

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wharves consist of 10 saw-tooth slips. These terminals are employed exclusively for shipments of lumber and are used largely by sailing vessels.

The Atlantic Coast Line Railroad has a wharf 540 feet long on its frontage near the main business district of the section. This wharf is used for general freight.

The terminals of the Seaboard Air Line Railway include the following piers and wharves:

| Piers or wharves. | Length. | Width. | Depth of water alongside. |
|---|---|---|---|
| | *Feet.* | *Feet.* | *Feet.* |
| Pier | 175 | 30 | 8-12 |
| Do | 470 | 280 | 24 |
| Do | 270 | 160 | 24 |
| Wharf | 940 | ..... | 22 |
| Do | 380 | ..... | 15-18 |

The terminals of the Seaboard Air Line Railway have three pier sheds, or warehouses, with the following dimensions:

| Sheds or warehouses. | Length. | Width. | Area. |
|---|---|---|---|
| | *Feet.* | *Feet.* | *Sq. feet.* |
| No. 1 | 300 | 84 | 25,200 |
| No. 2 | 451 | 84 | 37,884 |
| No. 3 | 376 | 110 | 41,360 |

The Southern Railway owns a wooden wharf 1,400 feet long, along which the depth of water is 18 to 25 feet.

**Type of wharf construction.**—The St. Johns River is wide enough to permit the construction of piers, which is the prevailing type of wharf. The privately-owned piers are of open pile-and-timber construction. The new municipal piers are solid sand-filled structures with bulkheads of steel interlocking sheet piling.

**Port administration.**—The administration of the port of Jacksonville is vested in a board of port commissioners. This board was created by an act of the new legislature passed at a special session in 1912. This act is quite similar to one previously passed by the legislature creating a similar board with similar powers for the port of Tampa.

This board consists of 15 members, who serve for a term of four years. Each member receives a salary of $100 per year. The members of the first board were named in the organic act and were to serve until a general city election in 1915, when their successors were to be chosen by popular vote.

The board is vested with the following powers:

1. To acquire by gift, purchase, lease, condemnation, or any other method of acquisition, any land or property whatsoever, including railroads and terminals already existing, interests, franchises, easements, rights, and privileges of any and every kind, either within or without the limits of the city of Jacksonville, Fla., which may be proper or desirable for the purpose of this act.

2. To acquire, construct, establish, equip, maintain, and operate public wharves, docks, piers, warehouses, railroad tracks, rolling stock, and all other buildings or

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things, either within or without the limits of said city of Jacksonville, Fla., as may be proper or desirable in connection with the objects of this act.

3. To widen, extend, or deepen the channel of the St. Johns River.

4. To do any and all other acts necessary or convenient in connection with the purposes of this act.

5. To execute leases or agreements for the use and occupation of the property under their control and also to fix such rates, charges, rules, and regulations for the use thereof, all of which shall be just, reasonable, equitable, and without discrimination, provided, however, the said port commissioners shall not execute any lease or agreement for the use or occupation of any part of said property for a term of years exceeding 10 years' duration unless thereto authorized by ordinances approving the leases. No lease shall be at any time made of the whole of such property, or of any such part thereof as will interfere with the furnishing by the port commissioners of ample dock and terminal facilities as municipal docks and terminals open to all on reasonable terms.

The act provides in effect that the funds of the board shall be kept separate from other city funds, although deposited with the city treasurer, and that no payments shall be made out of the funds of the harbor board except upon vouchers signed and duly approved by the board of port commissioners.

The recent trend in port administration affairs, which is a result of the experience of other cities, is to be seen in several provisions of this act:

1. In the practical limitation of leases to 10 years.

2. In the stipulation that no lease shall be made of the whole or of any such part of the municipal terminals as will interfere with the provision of ample terminals open to all on reasonable terms; and,

3. In the stipulation that all monies of the board of port commissioners shall be kept in a separate fund and shall be disbursed only upon warrants issued by the board itself.

In many ways this act and one passed a year later for the port of Tampa are excellent legislative enactments and for that reason a reprint of the act relating to Tampa has been made in Appendix C of this report, page 426. One criticism may be offered, however, of the act for Jacksonville, namely, that the board is too large for practical working purposes. The later act for Tampa provided for a board of only seven members.

**Port charges.**—*Pilotage.*—The charge for pilotage inward on the bar and up the river a short distance to Mayport is $2.50 per foot draft and for outgoing steamers $3 per foot draft. Vessels desiring to take pilots between Mayport and Jacksonville pay $1.50 per foot draft each way.

*Towage.*—Only barges and sailing ships require towing. Practically all of these vessels carry lumber and timber products and the usual towing rate is 30 cents per 1,000 feet b. m. from Jacksonville to sea and return. For commodities other than lumber the rates are proportioned according to the amount received from an average yellow-pine lumber cargo.

*Harbor dues.*—The laws of Florida provide for the appointment of a harbor master at the principal ports. This official is entitled to collect from each vessel that enters the port a fee not to exceed $20. The commercial interests of Jacksonville have, however, been able for some time past to keep this position unfilled in order that vessels may be spared this charge. They hope to have legislation effected which will place the harbor master under control of the board of commissioners. The intention is to pay the harbor master a salary and to collect no harbor dues. Apparently the practice at Jackson-

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ville was for the harbor master to collect $20 from every vessel and in most cases this charge was regarded as excessive and unreasonable.

*Dockage and wharfage.*—No dockage or wharfage charge is made at any of the wharves. In fact there is as yet no public wharf. The regular lines of steamships engaged in the coastwise and local river trade have their own docks while the sailing vessels and barges that call for lumber at the various terminals are not required to pay dockage or wharfage.

*Switching.*—A flat rate of $5 per car is made for switching.

## NEWPORT NEWS, VA.

The city of Newport News is situated on the left bank of the James River at its mouth in Hampton Roads. The city is about 10 miles northwest of Norfolk and is connected with deep water in Hampton Roads by a dredged channel having a minimum depth of 35 feet at mean low water.[a] The normal range of tide is 2.5 feet.

The prominence of Newport News as a port is due chiefly to the fact that it is the tidewater terminus of the Chesapeake & Ohio Railway, which extends through an important soft-coal district in southwestern Virginia and through the States of Ohio, Indiana, and Illinois. The establishment of the Newport News Shipbuilding & Dry Dock Co., with its large plant, has also aided in the development of the port.

**Railroads.**—Newport News is served directly by one railway, the Chesapeake & Ohio, and, indirectly, by the several railroads having their termini in Norfolk and Portsmouth, freight being interchanged in cars on floats.

**Steamship lines.**—The following is a list of the principal trans-Atlantic lines that call with more or less regularity at the port of Newport News:

Donaldson Line, with sailings once or twice a month between Norfolk, Newport News, and Glasgow.

Gans Steamship Line, which operates chartered steamers sailing once or twice a month between Norfolk and Rotterdam.

Hamburg-American Line, which before the war in Europe operated one boat monthly between Norfolk, Newport News, and Hamburg.

Holland-America Line, which operates one boat every two weeks between Norfolk, Newport News, Rotterdam, and Amsterdam.

Norway-Mexico Gulf Line, which operates a fleet of Norwegian steamers on a schedule of one steamer per month between Newport News, Havana, and Vera Cruz.

Virginia Line, which operates one boat about every two weeks between Norfolk, Newport News, Liverpool, and London.

The following is a list of the principal coastwise and local lines that call regularly at Newport News:

Clyde Steamship Co., which operates three boats weekly in each direction between Philadelphia, Norfolk, and Newport News.

Merchants & Miners' Transportation Co., which operates three boats weekly in each direction between Providence, Norfolk, Newport News, and Baltimore and has a similar service also between Boston, Norfolk, Newport News, and Baltimore.

Old Dominion Steamship Co., which operates one boat daily in each direction between Norfolk, Newport News, and Richmond.

Virginia Navigation Co., which operates three boats weekly in each direction between Richmond, various points on the James River, Newport News, Portsmouth, and Norfolk.

[a] Report, Chief of Engineers, U. S. Army, 1914, p. 444.

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**Commerce of the port.**—The following table shows the quantity and value of the principal commodities carried in the water-borne commerce of the port in 1913 and 1914: [a]

| Commodities. | Short tons. | | Value. | |
|---|---|---|---|---|
| | 1913 | 1914 | 1913 | 1914 |
| Miscellaneous | 803,270 | 705,360 | $193,923,200 | $141,072,000 |
| Coal | 3,428,320 | 4,447,789 | 10,284,960 | 13,343,367 |
| Grain | 266,273 | 64,739 | 10,000,000 | 2,750,312 |
| Tobacco | 10,055 | 36,616 | 2,011,000 | 5,126,240 |
| Cotton | 7,652 | 60,000 | 1,989,520 | 7,200,000 |
| Lumber | 108,020 | 108,220 | 1,693,300 | 180,015 |
| Flour | 21,267 | 18,683 | 552,420 | 2,241,960 |
| All other | 76,869 | 197,182 | 895,931 | 9,338,405 |
| Total | 4,721,726 | 5,638,589 | 221,350,331 | 181,252,300 |

The data compiled by the United States Engineers do not show separately the receipts and shipments or the export trade and the coastwise trade. Some idea of the extent of the foreign trade at this port is given by the following statistics of the Bureau of Foreign and Domestic Commerce for the year ended June 30, 1913, which show the total value of imports and exports and the value of five principal commodities in each branch of foreign trade. Statistics for the year 1913 are shown since that was the more nearly normal year and is, therefore, preferable for purposes of discussion.

| Commodities. | Value. | Commodities. | Value |
|---|---|---|---|
| IMPORTS. | | EXPORTS. | |
| Wood pulp | $1,129,694 | Breadstuffs | $8,814,840 |
| Fertilizer | 162,191 | Coal, bituminous | 2,184,759 |
| Toys | 146,547 | Boards, planks, and deals | 1,128,176 |
| Clay (china, etc.) | 143,098 | Tobacco, leaf | 638,531 |
| Ammonia, sulphate of | 122,200 | Cottonseed oil | 382,621 |
| All other | 557,142 | All other | 446,800 |
| Total | 2,260,872 | Total | 13,595,727 |

**Extent and ownership of water front.**—The length of direct water front available at the present time is from 2 to 3 miles. This frontage is held chiefly by the Chesapeake & Ohio Railway Co. and the Newport News Shipbuilding & Dry Dock Co. The city of Newport News has recently acquired a tract of water-front property covering about 100 acres and having a frontage along bulkhead lines of approximately 3,000 feet.

**Terminals.**—The city has recently constructed a municipal dock or basin at the junction of the James River and Hampton Roads. This basin consists of a slip 3,300 feet long, 300 feet wide, and from 15 to 20 feet deep. It is intended chiefly for the use of small craft, such as oyster, fish, and produce boats, and for the development of a large area for industrial sites.

*Chesapeake & Ohio Railway terminals.*—The principal terminals are those of the Chesapeake & Ohio Railway. The terminal yards

[a] Report, Chief of Engineers, U. S. Army, 1914, p. 1929; idem, 1915, p. 2312.

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have 75 miles of track, with a storage capacity of 4,000 cars. There are 11 piers in addition to 1 passenger slip and 2 car-transfer bridges.

The passenger slip is used by the passenger steamer operated by the Chesapeake & Ohio Railway for carrying passengers and mail between Newport News and Norfolk.

Pier No. 1 is a covered pier 400 feet long and 60 feet wide and is used for general cargo.

Piers No. 2 and No. 3 are elevated coal piers or trestles. Pier No. 2 is 342 feet long and 45 feet wide and Pier No. 3 is 790 feet long and 54 feet wide. Neither of these piers has been used since Pier No. 9 was completed.

Pier No. 4 is a merchandise pier 654 feet long and 160 feet wide. This pier has a two-story frame pier shed, with two depressed tracks through the middle of the first floor and one track on the second floor. Vessels can be loaded from either floor. This pier has also six elevators for moving freight between floors.

Pier No. 5 is a merchandise pier 790 feet long and 67 feet wide, with tracks extending through the center. This pier has a one-story pier shed of frame and timber construction. A grain elevator of 1,500,000 bushels capacity is located in the rear of the pier and is connected with it by means of a conveyor.

Pier No. 6 also is a merchandise pier. This pier is 710 feet long and 170 feet wide and has a one-story shed of frame and timber construction. It has two tracks extending through the center but has no handling facilities.

Pier No. 7 is a small pier and is used exclusively for the tying up of tugs and other small craft.

Adjacent to Pier No. 7 are two car-transfer bridges which are used in transferring freight cars to floats. Considerable freight is interchanged in this manner between the Chesapeake & Ohio Railway and the several railroads having termini in Norfolk and Portsmouth.

Pier No. 8 is a merchandise pier 809 feet long and 194 feet wide, with a one-story pier shed of frame and timber construction. This pier has two tracks in the center and one elevated track and a 30-ton electric crane on the north side. On the south side there is a conveyor that extends to grain elevator B, which has a capacity of 750,000 bushels.

Pier No. 9 is a coal pier which was completed in 1914. This pier is of steel and concrete construction, 120 feet long, 67 feet wide, and 95 feet above the river at low water. There are 33 hoppers and chutes on each side. The hoppers have a capacity of 110 gross tons each and are 30 feet apart, which permits every hatch of a vessel to be loaded at the same time.

In appearance, Pier No. 9, like those of the Virginian Railroad in Norfolk, resembles the ore trestles at the iron-ore ports on the upper Great Lakes. The method of loading, however, is somewhat different. The cars move by gravity from the yard in the rear of the pier to a mechanical car dumper. This dumper, which is electrically operated, transfers the coal from the road car into a specially constructed car of 100 tons capacity which operates under its own electric power and is used only on the pier. This pier car passes over automatic scales into an electric elevator by which it is raised to the top of the pier. It then moves out to the chute where its contents are unloaded.

Pier No. 9 has two car dumpers and two elevators, each set having a capacity for handling 100 tons every two minutes. The pier has, therefore, a nominal capacity of 6,000 tons per hour, and as many vessels as can find berthing space on both sides of the pier can be served at one time. On May 30, 1915, the steamer *Everett*, of the New England Coal & Coke Co. fleet, was loaded at this pier with 7,280 tons of cargo coal and 189 tons of bunker coal in two hours and forty-five minutes.[a]

Piers No. 10 and No. 11 are also coal piers but have been used comparatively little since Pier No. 9 was completed. So much greater dispatch can be secured at the new pier that the tendency is to have all of the cargo and bunker-coal loading done there. Both of these older piers are of timber construction. Pier No. 10 is 450 feet long and 54 feet wide; while Pier No. 11 is 850 feet long and 60 feet wide.

*Other private piers and dry docks.*—The Newport News Shipbuilding & Dry Dock Co. occupies about one-half mile of frontage and has seven piers, some of which are launching ways. Several piers are equipped with large cranes, derricks, and shear legs for handling heavy machinery, castings, and other supplies used in connection with the building or repair of vessels. The property of this company is connected with the tracks of the Chesapeake & Ohio Railway but there is no transfer of freight between car and

[a] Shipping Illustrated, June 5, 1915, p. 225.

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ship. This company has three large dry docks which are, respectively, 639 feet, 861 feet, and 585 feet in length overall, and 94 feet, 103 feet, and 99 feet in width at top at entrance.

Other private piers include Finch's pier, which is used by small boats, the pier of the Old Dominion Land Co., which is a long, wide, uncovered pier, and the Ivy Avenue Pier, which is long and narrow and is used by the ferry that operates between Newport News and Sewalls Point in Norfolk.

**Type of wharf construction.**—The piers are of pile and timber construction excepting Pier No. 9, which is a trestle of steel construction resting on concrete piers.

**Port administration.**—The port is under the control of the municipality, the administrative authority being vested in the municipal industrial commission. This commission was created chiefly for the purpose of constructing and operating the new municipal harbor and for the control of municipal sites for industrial plants. The commission consists of three members who are appointed by the mayor and the city council and serve without pay. The active management of port affairs is in the hands of a manager appointed by the commission.

**Port charges.**—*Pilotage.*—The charges for pilotage are the same as those at the port of Norfolk. (See p. 182.)

*Towage.*—Towage charges are the same as those at the port of Norfolk. (See p. 183.)

*Harbor dues.*—No harbor dues are assessed at this port.

*Dockage.*—A charge of 1 cent per net register ton per day is made for dockage, the day of arrival and of departure counting as one day.

*Wharfage.*—No charge is made against the cargo.

## NORFOLK, VA.

The city of Norfolk is located on the eastern bank of the Elizabeth River, about 7 miles above its confluence with the Nansemond and James Rivers in Hampton Roads, which opens into the extreme southwestern corner of Chesapeake Bay. The city is about 37 miles southwest of Cape Charles, Va., and about 187 miles south of Baltimore.

The port of Norfolk will, for the purpose of this report, be considered as including the water front and adjacent waterways within the limits of the cities of Norfolk, Portsmouth, and Berkley. These cities form practically one community, are reached by the same ship channel, and have the same general commercial interests; they can, therefore, justly be considered as constituting one port. The port of Norfolk includes the Elizabeth River, its eastern, western, and southern branches, and Tanners Creek, in addition to numerous small creeks and streams, none of which is of commercial importance. A map of the port is shown opposite this page.

In late years Newport News has been included with the "harbor at Norfolk" in the Federal appropriations for harbor improvements, and it is also included in the Norfolk customs district. Newport News is not, however, an integral part of the port of Norfolk because of its remoteness and also because of the independent and distinct character of its port facilities and commerce.

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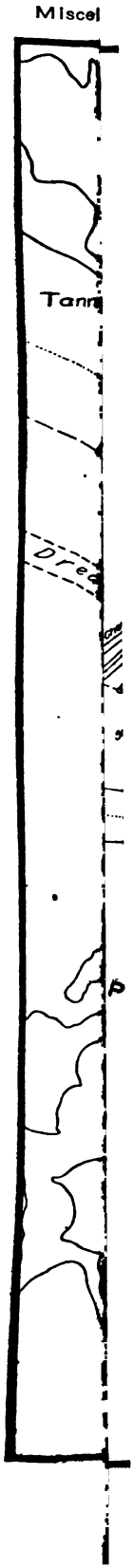


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The port of Norfolk resembles the port of Boston in that it is divided into several rather distinct sections by various rivers and creeks. Portsmouth is separated from Norfolk by the Elizabeth River proper, while Berkley is separated from Norfolk by the eastern branch of the Elizabeth and from Portsmouth by the southern branch. In Portsmouth, moreover, Scotts Creek separates the terminals of the Atlantic Coast Line Railroad and the Southern Railway on Pinners Point from the Seaboard Air Line Railway terminals. In Norfolk the terminals of the Norfolk & Western Railroad at Lamberts Point are separated from the Sewalls Point terminals of the Virginian Railway by Tanners Creek and are rather inaccessible to the terminals near the business district of the city because of various intervening creeks.

A navigable channel 500 feet wide and not less than 35 feet deep at mean low water extends from deep water in the ocean through the southern end of Chesapeake Bay and through Hampton Roads to the mouth of the Elizabeth River. A channel 400 feet wide and 35 feet deep at mean low water extends through the Elizabeth River and through the Southern Branch for a distance of about 2 miles to the drawbridge of the Belt Line Railroad just south of the navy yard. Beyond this bridge to the Norfolk & Western Railroad drawbridge, 2 miles above, the navigable channel is 20 feet wide, and for a distance of more than a mile above the belt line bridge it has a least depth of 25 feet, while for the remainder of the distance the depth is 22 feet. The range of tide is about 2.8 feet.

The Southern Branch is the northern approach to both of the inland water routes between Chesapeake Bay and Albemarle, N. C. One of these routes, the Dismal Swamp Canal, has at present a depth of about 9 feet at mean low water, while the other, the Albemarle & Chesapeake Canal, has a depth of about 8 feet. The former is privately owned, while the latter was acquired recently by the Federal Government and will be improved to a depth of 12 feet.

The Eastern Branch is now being improved under a project that calls for a channel 500 feet wide and 25 feet deep at mean low water extending from the 35-foot channel in the main river to the Norfolk & Western Railroad Bridge, a distance of about 5,700 feet, and 22 feet deep between that bridge and the Campostella Bridge, about 2,900 feet above.

The Western Branch also is being improved under a project that calls for a channel 300 feet wide and 24 feet deep at mean low water from the 35-foot channel in the main river to a considerable distance above, and a channel of the same depth but only 200 feet wide from that point to the West Norfolk Bridge. The depth of the channel at present, however, is only 20 feet at mean low water.

**Railroads.**—The port of Norfolk is served directly by the Atlantic Coast Line, the Norfolk Southern, the Norfolk & Western, the Seaboard Air Line, the Southern, and the Virginian Railroads, and indirectly (by means of car floats and ferries) by the Chesapeake & Ohio Railway and the New York, Philadelphia & Norfolk division of the Pennsylvania Railroad.

The Norfolk & Western Railroad and the Virginian Railway have their principal terminals in the city of Norfolk at Lamberts Point and Sewalls Point, respectively. The Norfolk Southern Railroad terminals are in Berkley, while the main terminals of the Seaboard Air Line, the Atlantic Coast Line, and the Southern Railway are in

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Portsmouth, the latter two being located on Pinners Point. The Chesapeake & Ohio Railway has car ferry terminals in Norfolk, while the car ferry terminals of the New York, Philadelphia & Norfolk Railroad are located at Port Norfolk on the Portsmouth side of the harbor, not far from Pinners Point.

Although the port of Norfolk is, like the port of Boston, divided into several rather distinct sections, the terminals are coordinated to a large degree by the Norfolk & Portsmouth Belt Line Railroad, which is a freight line extending from Port Norfolk to Portsmouth and Berkley and from South Norfolk to Burrell, Va. This railroad operates 13.8 miles of main track and 19.6 miles of sidings and connects with the tracks of the Atlantic Coast Line, the Norfolk Southern, the Norfolk & Western, the Seaboard Air Line, the Southern, and the Virginian Railroads, and with the car-float terminals of the New York, Philadelphia & Norfolk Railroad.

The water front adjacent to the business section of Norfolk, where a number of steamboat lines have landings and several railroads and private warehouses are located, is served by a branch of the Norfolk & Western Railroad. This railroad has a right of way through Water Street, which parallels the shore of the Eastern Branch, and this line is to all intents and purposes a marginal or harbor belt-line railroad.

**Steamship lines.**—The principal trans-Atlantic lines that call for freight at Norfolk are as follows:

Donaldson Line, with sailings once or twice a month between Norfolk, Newport News, and Glasgow.

Gans Steamship Line, which operates chartered steamers sailing once or twice a month between Norfolk and Rotterdam.

Hamburg-American Line, which before the war in Europe operated one boat monthly between Norfolk, Newport News, and Hamburg.

Holland-America Line, which operates one boat every two weeks between Norfolk, Newport News, Rotterdam, and Amsterdam.

Virginia Line, which operates one boat about every two weeks between Norfolk, Newport News, Liverpool, and London.

In addition, there are several lines of small boats that operate through the Chesapeake & Albemarle Canal between Norfolk and various routes on Albemarle Sound.

Large fleets in the coal-carrying trade of steamers, schooners, and barges operate between Norfolk, Newport News, Boston, and Providence. The following is a description of this traffic:

In normal times there are available for the movement of coal in the coastwise trade 107 barges, 16 steamers, and 68 schooners. This fleet is principally employed in carrying coal from Hampton Roads ports for distribution in New England. The 16 steamers carry coal exclusively and have a combined capacity of 79,000 tons a trip. If everything goes well and they operate on a regular schedule, 40 trips can be made in a year. * * * The fleet of 68 schooners has a combined capacity of 165,400 tons. * * * The 107 barges have a combined capacity of 262,300 tons of coal.[a]

The principal coastwise and local lines of steamships that call regularly at the port of Norfolk are as follows:

Baltimore & Philadelphia Steamboat Co., which operates one boat daily except Sunday in each direction between Baltimore and Philadelphia, calling also at Norfolk.

Baltimore Steam Packet Co., which operates one boat daily except Sunday in each direction between Baltimore and Norfolk.

Clyde Line, which operates three freight boats weekly in each direction between Newport News, Norfolk, and Philadelphia.

[a] The Black Diamond, Jan. 30, 1915, p. 88.

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Merchants & Miners' Transportation Co., which operates six boats weekly in each direction between Norfolk and Boston and six also between Norfolk and Providence.

Norfolk & Washington Steamboat Co., which operates one boat daily in each direction between Norfolk and Washington.

Old Dominion Steamship Co., which operates one boat daily except Sunday in each direction between New York and Norfolk, and one boat daily in each direction between Norfolk, Newport News, and Richmond.

Virginia Navigation Co., which operates three boats weekly in each direction between Norfolk, Portsmouth, Newport News, various James River landings, and Richmond.

**Commerce of the port.**—The commerce of the port of Norfolk amounted to 17,349,942 short tons, valued at $866,530,999 in the calendar year 1913, and to 19,848,658 short tons, valued at $1,084,106,750 in 1914. Included in this total is the bunker coal taken on by steamers that called at this port. The following table shows the quantity and value of the principal commodities that moved into or out of this port in the calendar years 1913 and 1914: [a]

| Commodities. | Short tons. | | Value. | |
|---|---|---|---|---|
| | 1913 | 1914 | 1913 | 1914 |
| Miscellaneous | 5,896,396 | 5,302,385 | $764,512,050 | $947,843,350 |
| Cotton | 151,817 | 152,562 | 37,953,750 | 15,256,250 |
| Coal | 9,484,760 | 9,582,826 | 33,473,834 | 33,539,891 |
| Fertilizer and fertilizer material | 671,780 | 605,064 | 8,928,145 | 13,694,661 |
| Cotton factory products | 21,476 | 20,102 | 4,293,400 | 4,540,100 |
| Tobacco | 18,722 | 18,452 | 3,744,400 | 2,388,400 |
| Lumber | 143,333 | 2,404,031 | 2,116,868 | 26,519,795 |
| Piling | 336,000 | 172,936 | 1,792,000 | 502,805 |
| Grain | 43,500 | 38,418 | 1,742,760 | 1,354,169 |
| Pig iron | 85,545 | 79,677 | 1,234,760 | 1,159,309 |
| Sugar | 11,211 | 63,763 | 896,880 | 7,747,440 |
| Peanuts | 10,871 | 9,718 | 842,542 | 680,260 |
| Steel rails | 28,082 | 15,127 | 842,400 | 453,810 |
| Fruit and vegetables | 17,500 | 225,817 | 700,000 | 11,248,350 |
| All other | 428,949 | 1,157,780 | 3,457,210 | 17,178,160 |
| Total | 17,349,942 | 19,848,658 | 866,530,999 | 1,084,106,750 |

The statistics compiled by United States Army Engineers do not distinguish shipments and receipts nor coastwise and foreign trade. A general idea of the foreign trade of the port, however, may be secured from the statistical reports of the Bureau of Foreign and Domestic Commerce, which show that in the year ended June 30, 1913, the imports were valued at $2,111,944 and the exports at $15,611,083.

The value of the principal imports and exports in 1913 is shown in the following tabular statement:

| Commodities. | Value. | Commodities. | Value. |
|---|---|---|---|
| IMPORTS. | | EXPORTS. | |
| Soda, nitrate of | $758,279 | Boards, planks, and deals | $4,534,000 |
| Fertilizers | 555,684 | Coal, bituminous | 4,296,915 |
| Ammonia, sulphate of | 518,749 | Cotton, upland | 4,107,884 |
| Copper ore | 53,892 | Breadstuffs | 449,180 |
| Paper stock, crude | 52,272 | Cottonseed oil | 430,202 |
| All other | 173,068 | All other | 1,792,902 |
| Total | 2,111,944 | Total | 15,611,083 |

[a] Report, Chief of Engineers, U. S. Army, 1914, p. 1923; idem, 1915, p. 2310.



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Some idea of the coastwise movement in coal and cotton may be had from the reports of the Boston Chamber of Commerce, which show that in the calendar year 1913 the receipts at Boston of soft coal brought by vessel from Norfolk amounted to 2,783,960 short tons, while the receipts of cotton similarly brought were 76,830 bales. Reports of the New York Cotton Exchange show that in the year ended August 31, 1913, 137,740 bales of cotton were brought to New York by steamers from Norfolk.

**Extent and ownership of water front.**—It has been estimated that the port of Norfolk has an available water front of 26 miles, of which less than one-half is in actual use. The water front owned by the cities of Norfolk and Portsmouth includes chiefly street ends. The Federal Government has extensive holdings of water-front property, the more important tracts being occupied by the United States Navy Yard and the Naval Hospital. The principal owners of the water front at the port of Norfolk are the railroad companies.

**Terminals.**—The only publicly owned terminal at the port of Norfolk is Roanoke Wharf, in the city of Norfolk. All other street ends and water-front property owned by the city of Norfolk in the commercial district have been leased for long terms to railroad or steamship companies or to other private interests. The same is true also in regard to street ends on the water front of Portsmouth.

Efforts have been made in recent years to establish publicly owned terminals in the city of Norfolk. In November, 1912, an ordinance was passed creating a dock and belt commission. This commission, which consisted of seven members, was instructed—

(1) To investigate and recommend to the council the purchase of a suitable site or sites with sufficient land for all necessary and proper warehouses and other structures at some point or points on the water front within or convenient to the city of Norfolk, and the acquisition, by erection or otherwise, of one or more wharves or docks of proper size and equipment to accommodate all such vessels as may from time to time enter this port for the purpose of taking on or discharging cargo, or for other purposes; (2) to ascertain, if possible, the reason why the Norfolk & Portsmouth Belt Line Railroad has not been extended to the Norfolk side of the Elizabeth River, and to enter into such investigations and negotiations as may be deemed proper, and advise the council, with its recommendations, as to the best means of accomplishing the extension of said Belt Line Railroad on the Norfolk side of the river as far as Sewalls Point, or the securing by other means of such facilities in said territory as would result by such extension; and (3) to consider and report as to such other matters as may in the opinion of said commission be of importance in connection with the accomplishment of the purposes hereinbefore outlined.

The members of the commission served without compensation, and no allowance was made for funds to carry on the investigation. The commission made a report in August, 1914, recommending the purchase of a tract known as the Egner property, located between Lamberts Point and Sewalls Point on the Elizabeth River. For some reason the report of the commission was not favorably received and no action has been taken to carry it into effect.

Within the last year another attempt has been made to provide for a public terminal in Norfolk, at Bush Bluff, not far from the Egner tract. Interests closely allied to the Virginian Railway Co. contemplate the construction of a series of terminals at this point. These terminals would ultimately comprise 9 piers, ranging from 1,800 to 2,200 feet in length and 200 feet in width, separated by slips 300 feet wide. In addition, the plan would provide for 3 car-transfer bridges and 10 small piers on Tanners Creek, these piers ranging from

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380 to 500 feet in length and having a width of 65 feet, with slips 200 feet wide. The smaller piers would be used by fish and vegetable boats.

These plans, which are as yet merely tentative, provide for a grant to the city of one of the long piers. These terminals would be connected with the main line of the Virginian Railway, which would be extended through the city of Norfolk and the town of Berkley to connect with the Belt Line Railroad. It is understood that the success of the entire project depends upon the outcome of negotiations that are now (August, 1915) in progress between the Virginian Railway and the various railroad interests that control the Belt Line Railroad.

*Terminals at Sewalls Point.*—The principal railroad terminals on the Norfolk side of the harbor are those of the Virginian Railway at Sewalls Point and the Norfolk & Western Railroad at Lamberts Point.

The terminal at Sewalls Point is used exclusively for handling cargo and bunker coal and consists of a trestle or pier. This trestle is of steel and concrete construction and is 1,045 feet long, 65 feet wide at the top, and from 71 to 78 feet above high water. The top of the pier is wide enough to accommodate three tracks, two for delivering coal to the hoppers and one, a track in the center, for the return of empty cars by gravity. The pier has 62 pockets, 31 on either side, each pocket having a capacity of 60 tons. Vessels can be loaded at either side, the slips being 30 feet deep at mean low water.

The following is a description [a] of the manner in which the coal is raised to the top of the pier and unloaded into hoppers:

Each car is run by gravity to the foot of an incline approach to the car-dumping plant, where it is engaged by an electrically operated barney hoist and pulled up to the upper level of the car dumper. After being emptied by the car dumper the car stands until kicked off by the next succeeding car and allowed to run down an incline to the empty yard. The operation of the car dumper is to pick up the railroad car bodily from its position on the upper track and turn it completely upside down so as to pour its contents down over a deflecting apron into a steel pier car of 60 tons capacity, which has meanwhile been brought into position on the lower track of the car-dumping plant. The empty railroad car is then returned to its normal position ready to be kicked off by the next full railroad car. We now have the railroad car's load of coal deposited in the pier car. The latter is allowed to run by gravity to the platform of a railroad scale for weighing its load. This scale is automatic in its operation and records the net weight directly, and the car immediately passes by gravity to a point where it is engaged by an electrically operated barney hoist and pulled up a 25 per cent incline leading onto the pier proper. Arrived on this pier the car continues its course by gravity to the desired point over the vessel, air brakes and air-operated dumping doors in the hopper bottom enabling the car to be spotted and unloaded quickly and accurately through adjustable chutes. Along each delivery track on each side of the pier there are 31 pockets and adjustable sliding hoppers and chutes of 60 tons storage capacity each. The sliding hoppers and chutes have a vertical range from 2 feet above low water to 40 feet above high water, thus enabling a very low vessel or an extremely high one to receive cargo or bunker coal without the usual spillage or breakage due to a high drop from the chute; they also have a slide range of 25 feet and can be adjusted to fit any style of hatch. As a vessel lowers with her cargo or with the tide, the chutes and sliding hoppers are lowered to keep the same relation to the vessel and keep the end of the chute in the hatch or bunker saddle. After being emptied through the chutes, the empty pier car proceeds by gravity and its own motors back inshore and to its receiving position at the car dumper ready for the next load. There are 10 of the pier cars in all, 5 of which are normally in use in the continuous operation of the pier. Each pier car is fully equipped with the necessary electrical, pneumatic, and mechanical apparatus. The bottom of the car is made up of four large circular undercut doors, operated either in unison or independently from a central shaft running the entire length of the car and controlled from the operating platform of the car.

[a] Shipping Illustrated, May 23, 1914, p. 185.

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*Terminals at Lamberts Point.*—The terminals of the Norfolk & Western Railroad at Lamberts Point include three coal piers, two general merchandise piers, and one open pier that was formerly used as a coal pier. The dimensions of these piers are given in the following tabular statement:

| Piers. | Length. | Width. | Piers. | Length. | Width. |
|---|---|---|---|---|---|
| Coal pier: | *Feet.* | *Feet.* | Merchandise pier: | *Feet.* | *Feet.* |
| No. 1 | 869 | 66 | No. 1 | 750 | 192 |
| No. 2 | 797 | 64 | No. 2 | 750 | 192 |
| No. 3 | 867 | 58 | | | |
| No. 4 | 1,200 | 67 | | | |

The superstructure of Coal Pier No. 1 has been removed. Coal Pier No. 2 has not been used since Pier No. 4 was completed, while Pier No. 3 is used only for supplying bunker coal. Coal Pier No. 4 is of recent construction and is very efficient. This pier is of steel and concrete construction and is 90 feet high. The handling of coal on this pier is somewhat different from the method in operation on the Virginian Railway Pier, which was the first modern coal terminal at this port. The chief difference is that at pier No. 4 the pier cars are raised to the top of the pier by an electric elevator and not over an incline as is the case at the Virginian Railway Pier. The method adopted at the latest Chesapeake & Ohio Coal Pier (No. 9) at Newport News is the same as that used at Pier No. 4 of the Norfolk & Western Railroad.

Merchandise Pier No. 1 has a pier shed of frame construction, one story in height, 703 feet long, and 140 feet wide. Merchandise Pier No. 2 has a pier shed of steel construction, two stories in height, 709 feet long, and 140 feet wide.

*Other railroad terminals.*—The Norfolk & Western Railroad owns about 1,740 feet of frontage on the Eastern Branch close to the business center of the city of Norfolk. These holdings include one small coal pier used for coaling tugs and for supplying retail dealers, one grain elevator of 100,000 bushels capacity used chiefly for local trade, and a warehouse used chiefly for interchange of freight between the Norfolk and Western Railroad and the Clyde Line of steamers.

The terminals of the Seaboard Air Line Railway are located in Portsmouth on the Southern Branch near its confluence with the Eastern Branch and cover an area of 21 acres, with a wharf frontage of about 7,200 feet. The following table shows the dimensions and area of the covered piers occupied by the Seaboard Air Line Railway and of the freight sheds on each:

| Designation of terminals. | Piers. | | | Pier sheds or warehouses. | | |
|---|---|---|---|---|---|---|
| | Length. | Width. | Area. | Length. | Width. | Area. |
| | *Feet.* | *Feet.* | *Sq. feet.* | *Feet.* | *Feet.* | *Sq. feet.* |
| Pier A | 525–535 | 261 | 133,110 | 500–510 | 100 | 50,000–51,000 |
| Pier B | 400–374 | 156 | 58,810 | 365 | 130 | 47,450 |
| Pier C | 358 | 196 | 84,055 | 260 | 200 | 52,000 |
| Pier D | 275–210 | 234 | 52,370 | 200 | 190 | 38,000 |
| Pier E | 655 | 109 | 70,756 | 480–100 | 80–85 | 8,500 |

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The above piers are used for the storage of freight interchanged between the Seaboard Air Line Railway and several steamship lines. In addition there are two wharves and two piers, all open structures that are used for lumber, two ferry slips, one slip for car floats, and a pier equipped with a coaling tower for supplying coal to tugs.

The terminals of the Atlantic Coast Line Railroad at Pinners Point in the city of Portsmouth cover an area of about 135 acres and includes four piers, a double-track trestle, and a car-transfer bridge. For convenience in reference these piers will be numbered as follows:

Pier No. 1 is about 800 feet long and 50 feet wide and is used chiefly for the transfer of passengers to steamers plying between this pier and one in the city of Norfolk.

Pier No. 2 is about 838 feet long and 106 feet wide and has a one-story timber warehouse 802 feet long and 73 feet wide.

Between Piers 2 and 3 there are a car-transfer bridge and a timber trestle nearly 850 feet in length.

Pier No. 3 is irregular in shape. For a distance of about 425 feet from shore it is approximately 188 feet wide, while for a farther distance of 425 feet it is only 75 feet wide, with a timber trestle 40 feet in width adjoining. This pier has a one-story timber warehouse about 790 feet long and 75 feet wide.

Pier No. 4 is about 800 feet long and 180 feet wide. This pier has two sheds or warehouses. One is 785 feet long and 61 feet wide and the other is 401 feet long and 73 feet wide. Each warehouse is one story in height and of timber construction.

Adjacent to the terminals of the Atlantic Coast Line Railroad are those of the Southern Railway, which cover an area of about 50 acres and include three piers and a car-transfer bridge, in addition to a cotton compress. The following table shows the dimensions of the several piers and pier sheds or warehouses owned by the Southern Railway Co.:

| Designation of piers. | Piers. | | Pier sheds or warehouses. | | |
|---|---|---|---|---|---|
| | Length. | Width. | Length. | Width. | Height. |
| | *Feet.* | *Feet.* | *Feet.* | *Feet.* | *Stories.* |
| No. 1 | 800 | 196 | 806 | 190 | 1 |
| No. 2 | 800 | 272 | 702 | 256 | 1 |
| No. 4 | 800 | 272 | 806 | 252 | 1 |

Each pier is well supplied with tracks, No. 1 having four long and three short tracks, No. 2 three long tracks, and No. 4 three tracks in the center and one on the outside.

The terminals of the New York, Philadelphia & Norfolk division of the Pennsylvania Railroad system are located at Port Norfolk, near the confluence of the Western Branch with the main river. The terminals comprise four double-track car bridges and a warehouse. Freight cars are brought on floats to this terminal from Cape Charles, which is located on Chesapeake Bay about 37 miles to the north. Connection is made at Port Norfolk with the Belt Line Railroad.

The main terminals of the Norfolk Southern Railroad are located in Berkley on the Southern Branch, and include a car-transfer bridge and three piers.

Pier No. 1 is 275 feet long and 175 feet wide on one side and 300 feet wide on the other. In the center of this pier is a frame shed or warehouse 150 feet long, 75 feet wide, and one story in height, and on either side is a covered platform, one being 275 feet long and 29 feet wide and the other 238 feet long and 26 feet wide. Pier No. 2 is only a half pier and has a shed 307 feet long and 61 feet wide. Pier No. 3 is used chiefly for lumber and has a shed 500 feet long and 47 feet wide.

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*Miscellaneous terminals.*—Most of the terminals of the steamboat lines are located on the water front of the city of Norfolk, adjacent to the main business district. In the same section the Atlantic Coast Line, the Chesapeake & Ohio, the New York, Philadelphia & Norfolk, the Norfolk Southern, the Seaboard Air Line, and the Southern Railroads have local terminals for handling passengers and car-float freight. A number of terminals are used as slips for the ferries that ply between Norfolk and Berkley and Portsmouth.

Large tracts of water-front property are occupied by marine railways and repair yards, lumber yards, creosoting works, and fertilizer plants. A large number of fertilizer plants and lumber yards are located on the Berkley shore of the Southern Branch, which also has several creosoting and wood-preserving plants, a cement mill, a marine railway, and an oil-storage plant.

The United States has extensive holdings on the Southern Branch. These holdings include about a mile of frontage occupied by the navy yard, in addition to that occupied by the St. Helena recruiting depot and the Gilmerton naval magazine, both of which are also controlled by the Navy Department. North of the navy yard the Bureau of Lighthouses occupies considerable frontage for the storage and repair of buoys.

Several important privately-owned warehouses are located on the Norfolk water front. The Norfolk Warehouse Corporation has a modern cotton warehouse and compress, and Jones & Co. have a two-story warehouse, which is used for general storage.

The Seaboard Wharf & Warehouse Co. has two wharves and warehouses in Portsmouth, as well as track connection with the terminals of the Seaboard Air Line Railway. The wharves, however, are not actively used at the present time.

**Type of wharf construction.**—Considerable detail regarding the character of wharf construction has been given in the section on terminals.

**Port administration.**—The port is under the control of the board of harbor commissioners of the ports of Norfolk, Portsmouth, and Norfolk County. This board consists of seven persons, three appointed by the councils of the city of Norfolk, two by the councils of the city of Portsmouth, and two by the judge of the circuit court of Norfolk County. The jurisdiction of this board extends to the Elizabeth River and all its branches and tributaries along the water front of the cities of Norfolk and Portsmouth and Norfolk County.

The powers of this board include (1) the power to establish harbor lines and to control the erection of wharves, piers, and other structures within those lines; (2) the power to remove obstructions to navigation and to control the dumping of dredged material; (3) the power to examine all water-front property and to report upon the condition of the same. The board appoints annually three harbor masters, who enforce the rules and orders of the board.

**Port charges.**—*Pilotage.*—The following table shows the rates of pilotage, per foot of draft, at the ports of Norfolk and Newport News for vessels with cargo and those calling only for bunker coal:

| Draft of vessel. | Cargo vessels. | Bunker vessels. |
|---|---|---|
| 8 to 9 feet | $2.50 | $1.50 |
| 10 to 12 feet | 3.50 | 2.00 |
| 13 to 15 feet | 4.00 | 2.50 |
| 16 to 19 feet | 4.50 | 3.00 |
| 20 feet and over | 5.00 | 3.00 |

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*Towage.*—The following is a list of the prevailing charges for towing paid by steamers calling regularly at the ports of Norfolk and Newport News:

| Services. | Charges for vessels having a net register tonnage of— | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | 2,000 to 2,999 | 3,000 to 3,999 | 4,000 to 4,999 | 5,000 to 5,999 | 6,000 to 6,999 | 7,000 to 7,999 | 8,000 to 8,999 | 9,000 to 9,999 |
| Docking at pier or moving from pier to stream: | | | | | | | | |
| With steam | $15.00 | $25.00 | $35.00 | $45.00 | $55.00 | $65.00 | $75.00 | $85.00 |
| Without steam | 25.00 | 40.00 | 50.00 | 60.00 | 70.00 | 80.00 | 90.00 | 100.00 |
| Shifting from dock to dock: | | | | | | | | |
| With steam | 15.00 | 20.00 | 25.00 | 30.00 | 35.00 | 40.00 | 45.00 | 50.00 |
| Without steam | 25.00 | 30.00 | 35.00 | 40.00 | 45.00 | 50.00 | 55.00 | 60.00 |
| Moving between railroad or private terminals: | | | | | | | | |
| With steam | 20.00 | 40.00 | 50.00 | 60.00 | 70.00 | 80.00 | 90.00 | 100.00 |
| Without steam | 35.00 | 50.00 | 65.00 | 80.00 | 95.00 | 110.00 | 125.00 | 145.00 |
| Moving from stream or docks at Newport News to Norfolk, including docking [a] | 75.00 | 100.00 | 125.00 | 150.00 | 175.00 | 200.00 | 225.00 | 250.00 |

[a] Without steam in reverse direction.

*Harbor dues.*—No harbor dues are assessed at this port.

*Dockage.*—No charge is made for dockage at any of the railroad terminals if any considerable part of the cargo of the vessel is shipped to or from the terminal over the railroad; otherwise, a charge of 1 cent per net register ton is made for each day a vessel occupies a berth at such a terminal.

*Wharfage.*—The prevailing charge for wharfage is 1 cent per 100 pounds; for wharfage and handling, 2 cents per 100 pounds; and for wharfage, handling, and storage for 30 days or less, 3 cents per 100 pounds.

## RICHMOND, VA.

The city of Richmond is located on the north bank of the James River at the head of navigation and about 104 miles distant by channel from Hampton Roads. The channel has a least width of 100 feet and a minimum depth of 18 feet at mean low water.[a] The mean range of tide is 2.5 feet at the mouth of the river and 4.2 feet at the city of Richmond.[b]

**Railroads.**—Richmond is served by the Atlantic Coast Line, the Chesapeake & Ohio, the Richmond, Fredericksburg & Potomac, the Seaboard Air Line, and the Southern Railroads, and by a small local line known as the Richmond & Rappahannock River Railroad.

**Steamship lines.**—The Old Dominion Steamship Co. operates one boat daily in each direction between Richmond, Claremont, Newport News, and Norfolk. The Virginia Navigation Co. operates three boats weekly in each direction between the same points. Only one foreign vessel entered the port in 1913.

**Commerce of the port.**—The commercial statistics compiled by the United States Army Engineers show that the water-borne commerce of the port in the calendar year 1914 amounted to 305,436 short tons, valued at $30,954,569. In the year 1913, which is the more nearly normal trade year and is, therefore, preferable for pur-

[a] Report, Chief of Engineers, U. S. Army, 1914, p. 450.
[b] Coast Pilot, Atlantic Coast, Part VI, p. 31.

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poses of discussion, it amounted to 332,179 short tons, valued at $30,675,417.[a] The principal specified class of commodities in the commerce of 1913 was general merchandise, the quantity being 135,766 short tons and the value $28,726,963. The only other items of importance were fertilizer and fertilizer materials ($602,009), gasoline ($371,857), and oils ($366,012).

**Extent and ownership of water front.**—The available water front within the corporate limits of the city of Richmond is approximately 1.5 miles. The city of Richmond owns 3,000 feet on the north side of Richmond Dock and 3,100 feet on the south side as well as a few other sections of frontage on the water. Railroad companies and the Old Dominion Steamship Co. are among the other owners of water front.

**Terminals.**—The city of Richmond owns three terminals, the most important of which is the Richmond Dock. This dock is a part of the basin formerly used by the canal boats of the old James River & Kanawha Canal. It is about 3,450 feet long, from 75 to 150 feet wide, and 15 feet deep in the center, and is supplied with water by a feeder of the canal. It is crossed near its lower end by a bridge of the Southern Railway Co., which has a draw opening for vessels up to 50 feet in width. Since the level of the ground adjacent to the dock is about 18 feet above low water, the dock is well protected against all but very high freshets.[b]

The dock is entered from the river through a solid masonry lock about 180 feet long, 35 feet wide, and 15 feet deep. The city of Richmond owns 3,000 feet on the north side of this dock, the remaining 450 feet belonging to the Chesapeake & Ohio Railroad. On the south side, a strip 3,100 feet long and 30 feet wide belongs to the city of Richmond. The frontage owned by the city is as yet unimproved by wharves.

The city has a small timber wharf at the foot of Ash Street. This wharf has a frontage of 40 feet and is used chiefly by the steam fire tug owned by the city. The city has recently completed, near Gillies Creek, a substantial wharf which has a frontage of about 700 feet and a depth alongside of 8 to 14 feet. The city plans to increase the depth to 18 feet for a distance of about 300 feet. The depth of the improved channel in the river is 18 feet.

The principal terminal at Richmond is the wharf owned by the Old Dominion Steamship Co., and used by its steamers and by those of the Virginia Navigation Co. This wharf has a frontage of about 428 feet and is covered by a warehouse for its entire length. Behind the wharf is a large storage warehouse and a spur track of the Southern Railway. An electric telpherage system is used for moving heavy freight between the storage warehouse and vessels and also for coaling the company's steamers. The Chief of Engineers reports that this wharf "is highly efficient except during high freshets, when it can not be used on account of being under water" and that the "greater part of the water-borne commerce of Richmond is handled at this wharf."[b]

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[a] Report, Chief of Engineers, U. S. Army, 1914, p. 1934; idem, 1915, p. 2316.
[b] Special Report of Chief of Engineers, U. S. Army, on Water Terminal and Transfer Facilities (H. Doc. No. 226, 63d Cong., 1st sess.), p. 624.

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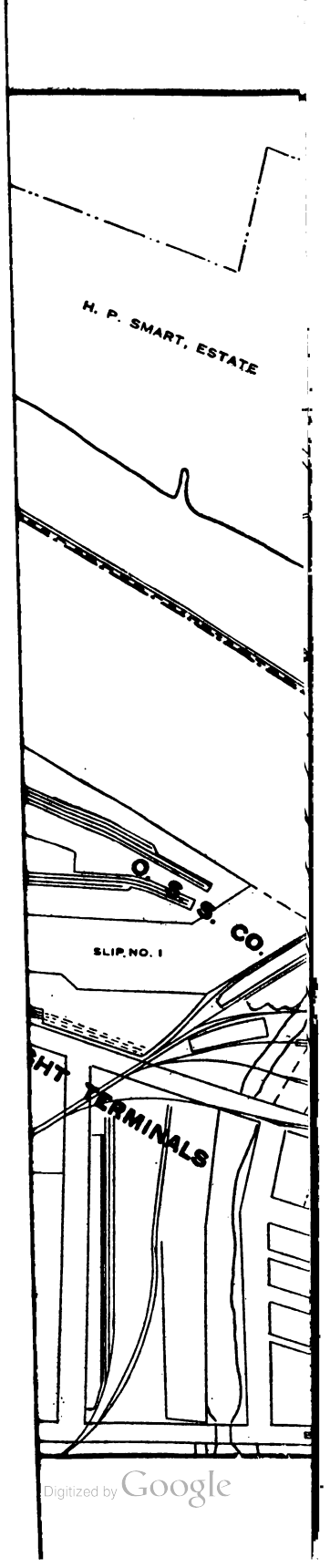


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The Southern Railway has a wharf about 560 feet long on the opposite side of the James River, but this wharf is not actively used. The Chesapeake & Ohio Railroad has a small wharf a short distance below the limits of the city, this wharf being used chiefly for the transfer of coal, railroad ties, and fertilizer materials.

Three fertilizer factories, one within and two just outside of the limits of the city, have wharves that are used solely for receiving fertilizer materials.

**Type of wharf construction.**—The wharves are of pile and timber construction and lie parallel to the stream.

**Port administration.**—The port is under municipal control, the administrative authority being vested in the Administrative Board. The only active port officials are the harbor master and the dock master. The former official attends to the mooring and berthing of vessels and keeps the channel of the river clear for the passage of vessels and the latter official attends to the berthing of vessels in Richmond Dock.

**Port charges.**—Since this harbor is used chiefly by local steamers and small craft, the subject of port charges, such as pilotage and towage, is of little general significance. No harbor dues are assessed, but a small dockage charge is made against vessels using Richmond Dock.

## SAVANNAH, GA.

Savannah is located on the south bank of the Savannah River about 26 miles from the ocean and is the principal port on the South Atlantic coast between Hampton Roads and Key West. The city is reached by a dredged channel which varies in width from 1,800 feet, at the mouth of the river, to 600 feet opposite the city, and has a minimum depth throughout of 26 feet at mean low water. The mean range of tide is 6.8 feet at the mouth of the river and 6 feet at the city.[a] A map of the harbor is shown opposite this page.

From the upper limits of the city of Savannah to the city of Augusta, a distance of 202 miles, the river is navigable during practically the entire year for vessels drawing 5 feet of water. Work has begun on improving this section of the river for a distance of about 9 miles above Savannah by dredging a channel 300 feet wide and 21 feet deep at mean low water. The appropriation for this work was made by Congress "subject to the condition that before the work was undertaken the city of Savannah should accept the parcel of land near the upper end of the proposed improvement, previously offered by interested parties, and give assurances satisfactory to the Secretary of War that the city would provide suitable terminal facilities thereat."[b] The city of Savannah has accepted the property, which has a river frontage of about 395 feet and extends back a distance of 1,050 feet, but as late as March, 1915, no terminal facilities had been provided.

**Railroads.**—The city of Savannah is served by the Atlantic Coast Line, the Seaboard Air Line, and the Central of Georgia Railroads, all of which have important terminals in this city. In addition, there is a small railroad, the Savannah & Northwestern Railway, which extends from Savannah to St. Clair, Ga., a distance of 109 miles.

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[a] Report, Chief of Engineers, U. S. Army, 1914, p. 544. [b] Idem, p. 545.

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Strictly speaking, no separate and independently operated belt-line railway intercepts and connects all the railroads. Along the water front adjacent to the main business district, however, the Central of Georgia Railway has a line of track which connects the terminals of that railroad with those of the Atlantic Coast Line Railroad as well as with the various private terminals that lie between. A city ordinance provides that the charge for switching cars to or from warehouses and wharves along this section of the river front shall be $1 per car.

**Steamship lines.**—The following table shows the principal lines of steamships engaged in foreign trade that call regularly, under normal conditions, at the port of Savannah:

| Lines. | Sailings. | Ports of destination. |
|---|---|---|
| Austro-Americana Line[a] | Not stated | Trieste, Fiume. |
| Creole Line | 1 monthly | Barcelona, Naples, Genoa. |
| Ganz Steamship Line[a] | 3 monthly | Antwerp, Bremen, Hamburg, Rotterdam. |
| Hamburg-American Line[a] | | |
| Leyland Line | 1 monthly | Liverpool |
| North German Lloyd Line[a] | Not stated | Bremen. |
| South Atlantic Steamship Line | 1 or 2 monthly | Liverpool, London, Hull, Newcastle. |
| Strachan Line | do | Liverpool, London, Manchester, Havre, Rotterdam. |

[a] Service suspended during the war in Europe.

The following is a list of the principal coastwise and local lines of steamships that call regularly at Savannah:

Ocean Steamship Co., with three sailings a week between Savannah and Boston and the same number between Savannah and New York.

Merchants & Miners' Transportation Co., with three sailings weekly in each direction between Baltimore, Savannah, and Jacksonville and the same number between Philadelphia, Savannah, and Jacksonville, in addition to four sailings weekly in each direction between Savannah and Jacksonville only.

Augusta-Savannah Navigation Co. (Augusta Barge Line), which operates two steel steamboats of 300 gross tons freight capacity.

The Georgia-Carolina Ferry Co. operates a ferry service between the city of Savannah and points on the South Carolina shore of the Savannah River.

**Commerce of the port.**—The water-borne commerce at Savannah amounted to 3,154,089 short tons, valued at $360,536,275 in the calendar year 1913, and to 2,478,535 short tons valued at $349,193,325 in 1914. In 1913, which was the more nearly normal trade year and is, therefore, preferable for purposes of discussion, less than one-fifth of the tonnage and less than one-fourth of the value was direct foreign trade, as is indicated in the following statement compiled from statistics collected by the United States Army engineer in charge of the Savannah district:[a]

| Class of trade. | Short tons. | | Value. | |
|---|---|---|---|---|
| | 1913 | 1914 | 1913 | 1914 |
| Foreign: | | | | |
| Receipts | 134,959 | 286,891 | $4,387,840 | $5,496,078 |
| Shipments | 433,908 | 471,921 | 76,950,685 | 52,438,894 |
| Total | 568,867 | 758,812 | 81,338,525 | 57,934,972 |

[a] Report, Chief of Engineers, U. S. Army, 1914, p. 2063; idem, 1915, p. 2413.

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| Class of trade. | Short tons. | | Value. | |
|---|---|---|---|---|
| | 1913 | 1914 | 1913 | 1914 |
| Coastwise: | | | | |
| Receipts | 891,847 | 830,372 | $148,430,836 | $149,054,566 |
| Shipments | 1,319,174 | 570,855 | 123,446,667 | 136,384,908 |
| Total | 2,211,021 | 1,401,227 | 271,877,503 | 285,439,474 |
| Local (inland waterways): | | | | |
| Receipts | 50,390 | 152,067 | 3,141,399 | 3,100,930 |
| Shipments | 196,870 | 7,889 | 3,769,032 | 1,999,509 |
| Total | 247,250 | 159,956 | 6,910,431 | 5,100,439 |
| Bunker coal | 126,951 | 158,540 | 409,816 | 718,440 |
| Grand total | 3,154,089 | 2,478,535 | 360,536,275 | 349,193,325 |

Details showing the quantity and value of the principal commodities handled at Savannah in the coastwise and foreign trade are lacking, but the United States Army engineer reports that cotton, lumber, and naval stores constituted the chief shipments. The following quantities were shipped to foreign and coastwise ports in 1913: Cotton, 1,699,346 bales; lumber, 177,340,185 feet; and, in naval stores, turpentine, 219,177 barrels; and rosin, 1,000,120 barrels.

Much of the cotton is shipped to New York and Boston, largely for distribution in the cotton-manufacturing centers of New England, although a considerable quantity also is transshipped at those ports to vessels bound for Europe. The following table shows, for the cotton season of 1913–14 (Aug. 1 to July 31), the number of bales of upland and sea-island cotton shipped from Savannah to United States and foreign ports:[a]

| Ports. | Upland. | Sea-island. | Total. |
|---|---|---|---|
| Coastwise: | | | |
| Baltimore | 69,328 | $595 | $69,923 |
| Philadelphia | 39,260 | ..... | 39,260 |
| New York | 206,700 | 23,851 | 230,551 |
| Boston | 227,831 | 9,842 | 237,673 |
| Total coastwise | 543,119 | 34,288 | 577,407 |
| Foreign: | | | |
| Great Britain— | | | |
| Liverpool | 133,677 | 3,889 | 137,566 |
| Manchester | 88,152 | 3,650 | 91,802 |
| Total | 221,829 | 7,539 | 229,368 |
| Germany— | | | |
| Bremen | 460,296 | 180 | 460,476 |
| Hamburg | 93,068 | ..... | 93,068 |
| Total | 553,364 | 180 | 553,544 |
| France— | | | |
| Havre | 238,421 | 1,934 | 240,355 |
| Dunkirk | 585 | 50 | 635 |
| Total | 239,006 | 1,984 | 240,990 |
| Other European countries | 186,547 | 301 | 186,848 |
| Japan | 34,350 | ..... | 34,350 |
| Total foreign | 1,235,096 | 10,004 | 1,245,100 |
| Grand total | 1,778,215 | 44,292 | 1,822,507 |

[a] Forty-second Annual Report of Savannah Cotton Exchange.

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A large proportion of the naval stores shipped from Savannah also moves to north Atlantic ports, as is indicated by the following tabular statement compiled from the report of the Savannah Board of Trade for the year ended March 31, 1914, which shows the number of barrels shipped in 1913:

| Ports. | Turpentine. | Rosin. |
|---|---|---|
| Coastwise: | *Barrels.* | *Barrels.* |
| Baltimore | 3,576 | 30,777 |
| Philadelphia | 5,162 | 38,833 |
| New York | 16,085 | 92,612 |
| Boston | 20,257 | 47,391 |
| Interior points | 5,250 | 44,981 |
| Packing | 2,128 | ..... |
| Total | 52,458 | 254,594 |
| Foreign | 152,476 | 378,981 |
| Grand total | 204,934 | 633,575 |

The inbound traffic of this port is almost entirely coastwise and consists chiefly of general merchandise such as groceries, dry goods, hardware, and similar articles for distribution by Savannah wholesale merchants.

On the Savannah River, between Savannah and Augusta, 33,902 short tons of freight, valued at $8,897,112, were moved in the calendar year 1913. This traffic consisted largely of cotton and general merchandise.

**Extent and ownership of water front.**—The distance by river between the lower and upper limits of the improved water front on the south bank of the Savannah River is 4 miles and on Hutchinson Island, on the opposite bank of the river, about eight-tenths of a mile, or 4.8 miles in all. The width of the river between these limits varies from 500 to 700 feet and the width of the improved channel, which has a depth of 26 feet at mean low water, is 400 feet.

The United States Army engineer in charge of the Savannah district reported in 1913 [a] that of the total developed frontage the city of Savannah owned only one-tenth of a mile, various individuals owned 1.7 miles, and the railroad companies owned 3.1 miles.

Within the limits of the present wharf development there are several miles of undeveloped frontage, much of which, including one-half mile of deep-water frontage on Fig Island, which adjoins Hutchinson Island, is owned by the city.

The Atlantic Coast Line Railroad owns 1.1 miles of developed frontage and six-tenths of a mile of undeveloped frontage. The Seaboard Air Line Railroad occupies eight-tenths of a mile of developed frontage, which is improved by three deep slips that add 1.8 miles to the lineal wharf frontage of this company. In addition this line has about four-tenths of a mile of undeveloped frontage. The Central of Georgia Railway owns 1.2 miles of river frontage, all of which is developed. Four long slips increase their wharf line frontage to 2.6 miles.

[a] Special Report of Chief of Engineers, U. S. Army, on Water Terminal and Transfer Facilities (H. Doc. No. 226, 63d Cong., 1st sess.), p. 707.

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**Terminals.**—The city of Savannah owns comparatively little improved water frontage. There are eight so-called "public docks," six of which consist of small wharves at the foot of East Broad, Lincoln, Abercorn, Whitaker, Barnard, and West Broad Streets. The public docks at the foot of Drayton and Bull Streets have been merged with the intervening wharf, which has recently been purchased by the city. This gives the city an improved frontage of about 450 feet near the principal business district.

The city also owns a small parcel of land on the river several miles above the center of the city, with a frontage of 395 feet, which an act of Congress requires should be provided with "suitable terminal facilities." [a] To date the city has taken no steps for the improvement of this property. In addition, the city owns about one-half mile of deep-water frontage on Fig Island, which adjoins the terminals of the Seaboard Air Line Railway and lies opposite those of the Atlantic Coast Line Railroad.

*Atlantic Coast Line terminals.*—The terminals of the Atlantic Coast Line Railroad are located on the eastern border of the city and are the first to be reached by vessels proceeding from the ocean. The property has a river frontage, measured along harbor lines, of approximately 1.7 miles and covers an area of about 377 acres. The major portion, about 1.1 miles, of the frontage has been improved by wharves lying parallel to the river. The river is not wide enough at this point to permit the construction of long piers, but the depth of the property is sufficient to permit the excavation of long slips.

These terminals have extensive facilities for the handling and storage of cotton, naval stores, and fertilizer materials, and large tracts in the rear of the wharves are leased to establishments manufacturing fertilizers.

At the eastern end of the improved frontage the railway company has recently erected a large two-story warehouse of frame construction for the storage of kainit and other potash salts. This warehouse, which has a floor area of 57,500 square feet, is located near the wharf, with which it is connected by an elevated runway and conveyor system. The kainit will be taken from the hold of the vessel in buckets raised and lowered by the ship's tackle and dumped into a bin from which small cars will be filled. These cars will be hauled by motors either into the warehouse and dumped there by an automatic kick or on an outside track and dumped through chutes into box cars. Near the middle of this frontage the company has another kainit warehouse, which covers an area of 26,500 square feet.

Near this warehouse is a somewhat similar overhead electric train conveyor, which extends from the wharf to the plant of the Southern States Phosphate & Fertilizer Co., a distance of nearly a third of a mile. This structure is used to carry to the plant various fertilizer materials discharged at the wharf.

The Savannah Guano Co. also has an electric conveyor, which extends from the wharf front near the turpentine sheds, described below, to its plant about 1,000 feet back.

A small frontage is used as a landing for the ferry boat operated by the Georgia-Carolina Ferry Co.

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[a] Report, Chief of Engineers, U. S. Army, 1914, p. 545.

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Large sections of the Atlantic Coast Line property are improved by sheds for the storage of turpentine, there being three such sheds with a total floor area of 213,200 square feet. Considerable space is devoted also to the storage of rosin, two sheds with a total floor area of 65,700 square feet and a large open space with an area of about 1,000,000 square feet being used for the handling of rosin. A number of electric trucks are used to carry the rosin and turpentine to the wharf. Because of the great distances of the storage sheds and spaces from the ship's side, electric trucks have been found to be more efficient than hand trucks and far more economical despite the comparatively low scale of wages paid to hand-truck labor.

To the west of the naval stores sheds are seven cotton sheds, with a total floor area of 202,260 square feet. All of these sheds are one story in height and are of frame construction. Three of the sheds occupy a wharf frontage of approximately 1,125 feet.

At the extreme western end of the terminal property of the Atlantic Coast Line Railroad are the extensive cotton sheds of the United Hydraulic Cotton Press Co., which is a subsidiary of the railroad company. These sheds are one story in height, cover a floor area of 382,250 square feet, and include two large compresses.

*Seaboard Air Line terminals.*—The terminals of the Seaboard Air Line Railway are located on Hutchinson Island, which lies opposite the main section of the city of Savannah. This property, which now covers about 1,200 acres,[a] was sold for a nominal amount by the city of Savannah to the Georgia & Alabama Terminal Co. The Seaboard Air Line Railway Co. owns the entire capital stock of the terminal company.[a] The original tract has been greatly extended by bulkheading and filling.

Hutchinson Island is connected with the mainland by a lift bridge across the river, about 2 miles above the business center of the city. The property has been improved for terminal purposes by the excavation of three long slips, 200 feet in width, and by bulkheading and filling in the intervening land. The slips and piers have the following dimensions:

| Slips and piers. | Length, east side. | Length, west side. | Width. |
|---|---|---|---|
| | *Feet.* | *Feet.* | *Feet.* |
| Slip— | | | |
| No. 1 | 2,006 | 1,944 | 200 |
| No. 2 | 1,360 | 1,320 | 200 |
| No. 3 | 1,780 | 1,720 | 200 |
| Pier— | | | |
| No. 1 | (a) | 2,006 | 229–500 |
| No. 2 | 1,944 | 1,360 | 310 |
| No. 3 | 1,320 | 1,780 | 814 |
| No. 4 | 1,720 | (a) | 300–100 |

[a] Half pier.

The total length of berthing along the sides and ends of the three slips and at the end of the four piers is 12,383 feet, but a portion of this total frontage is unavailable for dockage.

Pier No. 1 is a half pier—that is, has water frontage on one side only. This pier is devoted largely to the storage and handling of naval stores and has a large shed for the storage of turpentine and large yards for storing rosin, in addition to a building used by Armour & Co. for fertilizer materials.

[a] Poor's Manual of Railroads, 1915, p. 1056.

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The major portion of Pier No. 2 is open and is used for lumber, ties, and posts. A portion is used for an open shed and for a cottonseed-cake warehouse.

Pier No. 3, which is by far the largest of the four piers of this company, is covered almost entirely with one-story warehouses or sheds for compressing and storing cotton. Many of the sheds are old and are of frame construction, but there are a number of new sheds built of brick.

Pier No. 4 is a half pier and has three warehouses and an open shed. This pier is used largely for general freight.

*Ocean Steamship Co. terminals.*—The terminals of the Ocean Steamship Co., which is a subsidiary of the Central of Georgia Railway, are extensive. This property has a river frontage, measured along the harbor lines, of approximately 1.2 miles and an area of about 1,600 acres. Much of this property was formerly rice swamp and has been reclaimed. A portion of the property having about 1,100 feet frontage and adjoining the terminals of the Ocean Steamship Co. is leased to the Merchants & Miners' Transportation Co., but the greater portion is used for the terminals of the Ocean Steamship Co. and the Central of Georgia Railway.

The wharves are located along four slips of the following dimensions:

| Slips. | Length. | Width. | Slips. | Length. | Width. |
|---|---|---|---|---|---|
| | *Feet.* | *Feet.* | | *Feet.* | *Feet.* |
| No. 1 | 900 | 200 | No. 3 | 900 | 225 |
| No. 2 | 800 | 200 | No. 4 | 1,020 | 225 |

Slips Nos. 1, 2, and 3 have creosoted pile bulkheads with timber wharves, while Slip No. 4, which has been completed recently, has a reinforced-concrete bulkhead on all sides.

On the wharves along Slip No. 1 are frame sheds which have a total floor area of more than 100,000 square feet and which are used primarily for the storage and handling of cotton and are equipped with a number of electric trucks.

On either side of Slip No. 2 are long sheds with a combined floor area of approximately 400,000 square feet. One shed, with a floor space of 195,630 square feet, is used for the storage of turpentine. On Slip No. 3 are two long but narrow sheds with a combined floor area of about 140,000 square feet, while on the river front west of Slip No. 3 are three warehouses which are used for the storage of fertilizer material and have a total floor space of 114,180 square feet. All of these sheds and warehouses are one story in height and of timber construction and have extensive track facilities.

The river frontage west of Slip No. 3 is used almost entirely for the handling of fertilizer material. A wharf along this section of the river has an overhead platform throughout its entire length. This platform is about 40 feet above the river and has five portable hoppers, with a capacity of 5 tons each, which can be moved on a set of tracks to a point opposite the ship's hatch that is to be unloaded. Ship's power is used in elevating the fertilizer material from the hatch into these portable hoppers. The material is then dumped from the hoppers into cars of 5 tons capacity, which are operated on an electric third-rail system, and carry the material into the warehouses in the rear of the wharf.

The overhead platform and track system has a 160-foot extension, which is equipped with four 40-ton chutes for unloading bulk material directly into box cars. The material after being dumped from the electric cars into the chutes is carried into box cars through another chute, electrically operated, to a box-car loader which distributes the material in the car.

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Along the sides and at the shore end of Slip No. 4 will be constructed general freight sheds, which will cover an area of 11½ acres. The sheds will be of brick and steel construction. The shed on the north side of the slip will cover 249,733 square feet, while those at the head and on the south side of the slip will have a floor area of 30,910 square feet and 166,898 square feet, respectively.

These sheds will be provided with 17 tracks, which will permit the simultaneous loading or unloading of 100 cars in the north shed and 125 cars in the south shed. The handling of freight between cars or warehouses and vessels will be facilitated by five 10-ton traveling cranes operating on 1-beam trolley tracks. In addition, there will be a shed covering 49,266 square feet for handling city freight and an office building containing a waiting room for passengers.

*Other terminals.*—The terminals of the Merchant & Miners' Transportation Co., which occupy about 1,100 feet of frontage, adjoin the terminals of the Ocean Steamship Co. and are leased from that company. The wharf is parallel to the river and is of concrete construction.

A one-story wharf shed 1,100 feet long and about 150 feet wide covers the entire wharf. It is of frame construction sheathed with sheet iron. It is served by four switch tracks from the Central of Georgia Railway, but none enters the warehouse. In the rear of the tracks are several brick warehouses, space in which is leased to the American Steel & Wire Co., the Pittsburgh Steel Co., the Conklin Tin Plate Co., the Crane Co. (plumber's supplies), and the Quaker City Flour Co.

The wharf is equipped with two Otis inclined dock elevators, which are electrically operated, and five electric trucks.

From the western limits of the city of Savannah to the bridge of the Seaboard Air Line Railway, a distance of more than three-quarters of a mile, the river front is occupied by industrial concerns. The Hilton Dodge Lumber Co. occupies two tracts with a combined frontage of about 1,950 feet; the Southern Cotton Oil Co., 710 feet; the Virginia-Carolina Chemical Co., 630 feet; American Can Co., 175 feet; the old city waterworks property, 225 feet; and the Pierpont Manufacturing Co., 450 feet.

The frontage adjacent to the main business district of the city and lying between the Atlantic Coast Line Railroad terminals on the east and those of the Ocean Steamship Co. on the west is not on the whole actively used for commercial purposes. The city owns the frontage of a number of streets and wharves in this section of the river front. The Seaboard Air Line Railway has a wharf for handling city freight and another for its ferry. The steamboats plying between Savannah and Augusta occupy another wharf, while considerable frontage is occupied by two ship-repair plants and marine railways, and by an electric power plant, three coal companies, a towing concern, and a few others.

**Type of wharf construction.**—As has already been indicated, the prevailing type of construction is that of pile-and-timber bulkhead wharves fronting on long slips or on the main channel. One slip, No. 4 of the Ocean Steamship Co., has reinforced-concrete bulkheads. The use of slips is especially noteworthy. At no port in the United States is to be found a more extensive wharf frontage on slips or such long slips.

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The wharf sheds are, as a rule, of frame construction, but the tendency is toward the use of brick or steel and brick. The newer sheds of the Seaboard Air Line Railway are built of brick, while the extensive sheds recently erected by the Ocean Steamship Co. are of steel and brick.

**Port administration.**—The port is under the control of the municipality, the administrative authority being vested in the harbor and wharf committee, consisting of three aldermen selected by the mayor. Plans for such harbor-engineering work as is done by the city are prepared by the city engineer. The only active port official is the harbor master, who receives a salary of $1,800 per year. There is also a port warden, who receives no compensation and whose duties are largely perfunctory.

**Port charges.**—*Pilotage.*—The following table shows the pilotage charges at this port:

| Draft of vessel. | Total. | Bar to Cockspur. | Cockspur to Savannah. | Draft of vessel. | Total. | Bar to Cockspur. | Cockspur to Savannah. |
|---|---|---|---|---|---|---|---|
| 6 feet | $19.00 | $11.75 | $7.25 | 22 feet | 128.00 | 80.00 | 48.00 |
| 7 feet | 21.50 | 13.25 | 8.25 | 23 feet | 146.00 | 91.25 | 54.75 |
| 8 feet | 24.00 | 15.00 | 9.00 | 24 feet | 168.00 | 105.00 | 63.00 |
| 9 feet | 26.50 | 16.50 | 10.00 | 24½ feet | 174.00 | 108.75 | 65.25 |
| 10 feet | 32.00 | 19.75 | 12.25 | 25 feet | 180.00 | 112.50 | 67.50 |
| 11 feet | 37.50 | 23.50 | 14.00 | 25½ feet | 186.00 | 116.25 | 69.75 |
| 12 feet | 41.50 | 26.00 | 15.50 | 26 feet | 192.00 | 120.00 | 72.00 |
| 13 feet | 46.00 | 28.50 | 17.50 | 26½ feet | 198.00 | 123.75 | 74.25 |
| 14 feet | 55.00 | 34.25 | 20.75 | 27 feet | 204.00 | 127.50 | 76.50 |
| 15 feet | 62.50 | 39.00 | 23.50 | 27½ feet | 210.00 | 131.25 | 78.75 |
| 16 feet | 69.50 | 43.50 | 26.00 | 28 feet | 216.00 | 135.00 | 81.00 |
| 17 feet | 78.50 | 49.00 | 29.50 | 28½ feet | 222.00 | 138.75 | 83.25 |
| 18 feet | 87.00 | 54.00 | 33.00 | 29 feet | 228.00 | 142.50 | 85.50 |
| 19 feet | 97.00 | 60.50 | 36.50 | 29½ feet | 234.00 | 146.25 | 87.75 |
| 20 feet | 100.00 | 62.50 | 37.50 | 30 feet | 240.00 | 150.00 | 90.00 |
| 21 feet | 112.00 | 70.00 | 42.00 | | | | |

*Towage.*—The following statement shows the towage charges at this port:

| | | |
|---|---|---|
| Coastwise vessels: | | |
| Sea buoy to city, loaded (direct) | per ton.. | $0.10 |
| Sea buoy to city, light (direct) | do.... | .08 |
| City to sea, loaded (direct) | do.... | .12 |
| Single-deck vessels, in and out and docking (per year) | do.... | .18 |
| Double-deck vessels, in and out and docking (per year) | do.... | .17 |
| Foreign vessels: | | |
| Sea buoy to city, loaded (direct) | per ton.. | .12 |
| Sea buoy to city, light (direct) | do.... | .10 |
| City to sea, loaded (direct) | do.... | .15 |
| Drop to bight (extra) | do.... | .03 |
| Drop to quarantine, to or from sea (extra) | do.... | .03 |
| Drop to Tybee (bound up) | do.... | .03 |
| Schooners: | | |
| Under 300 tons | | 6.00 |
| 300 to 600 tons | | 8.00 |
| 600 to 900 tons | | 10.00 |
| 900 to 1,200 tons | | 12.00 |
| 1,200 to 1,500 tons | | 15.00 |
| Steamships: | | |
| Under 2,000 tons | | 25.00 |
| 2,000 to 2,500 tons | | 30.00 |
| 2,500 to 3,000 tons | | 35.00 |
| 3,000 to 3,500 tons | | 40.00 |
| 3,500 to 4,000 tons | | 45.00 |
| 4,000 to 4,500 tons | | 50.00 |
| 4,500 to 5,000 tons | | 55.00 |
| 5,000 to 5,500 tons | | 60.00 |



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| | |
|---|---|
| Square rig vessels: | |
| 300 to 600 tons | 10.00 |
| 600 to 900 tons | 12.00 |
| 900 to 1,200 tons | 15.00 |
| 1,200 to 1,500 tons | 18.00 |
| 1,500 to 1,800 tons | 20.00 |

*Harbor dues.*—The following harbor dues are assessed:

| | | |
|---|---|---|
| Transient vessels: | | |
| Brig or schooner | per call | $4.00 |
| Ship or bark | do | 6.00 |
| Steamship | do | 15.00 |
| Regular coastwise vessels: | | |
| Steamship | per month | 6.00 |
| Bark, brigantine, brig, or schooner | per trip[a] | 4.00 |
| Vessels on inland waterways, 40 feet or more in length[b] | per foot quarterly | .02 |

*Dockage and wharfage.*—All of the coastwise and local lines of steamships using this port own or lease their own wharves. Vessels in the foreign trade are accommodated without charge at the railroad terminals.

## WASHINGTON, D. C.

The city of Washington is located at the head of navigation on the Potomac River about 110 miles north of Chesapeake Bay and is a terminus of the Chesapeake & Ohio Canal.

A draft of 23 feet can be carried to the city from the ocean via Chesapeake Bay and Potomac River. Washington Channel, which is adjacent to the principal commercial portion of the river front, is 2¾ miles long, 350 feet wide, and from 24 to 26 feet deep at mean low water. The improved channel in the Anacostia River has a depth of 20 feet and a width of 400 feet as far as the gun factory at the United States navy yard.

The mean range of tide is 3 feet at Washington and as low as 1.1 feet at one point (Riverside) between Chesapeake Bay and the city.

**Railroads.**—Washington is served directly by the Baltimore & Ohio, the Chesapeake & Ohio, the Pennsylvania, the Southern, and the Washington Southern (Richmond, Fredericksburg & Potomac) Railroads. The Atlantic Coast Line and the Seaboard Air Line Railroads reach Washington over the tracks of the Washington Southern Railway.

None of these railroads, except the Baltimore & Ohio, owns waterfront property in Washington. The Baltimore & Ohio Railroad Co. owns about 130 feet of frontage at the foot of Thirtieth Street NW., and is the only railroad in the city that connects with any of the private wharves, connection being made with three wharves in the Georgetown section of the city and with a wharf at Giesboro Point. The Pennsylvania Railroad has a spur-track connection with the United States navy yard on the Anacostia River.

Although there is a notable lack of connection between the wharves and the railroads, the rail and water carriers have, nevertheless, made mutual contracts for the interchange of freight, the transfer between rail and ship being effected by trucking. Such contracts are in effect between the Norfolk & Washington Steamboat Co. on the one hand, and the principal railroads and the Potomac & Chesapeake Steamship

[a] With maximum of $8 per year.

[b] Overall measurement.

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Co., on the other; also between the Potomac & Chesapeake Steamship Co. and the Baltimore & Ohio and Pennsylvania Railroads.

**Steamship lines.**—The following principal lines of steamships call regularly at Washington:

Maryland, Delaware & Virginia Railway Co.'s Potomac River line, which operates three boats weekly in each direction between Washington, Baltimore, and a number of intermediate points.

Norfolk & Washington Steamboat Co., which operates one boat daily in each direction between Washington, Old Point Comfort, and Norfolk.

Potomac & Chesapeake Steamboat Co., which operates one boat daily in each direction between Washington and various points on the Potomac River.

In addition there are several lines of excursion boats that are operated regularly in the summer season between Washington and near-by pleasure resorts.

**Commerce of the port.**—The water-borne commerce at Washington in the calendar year 1913 amounted to 1,181,957 short tons, valued at $33,825,142.[a] The following table[a] shows the quantity and value of this commerce classified by sections of the harbor:

| Sections of harbor. | Short tons. | Value. |
|---|---|---|
| Potomac River: | | |
| Washington Channel | 253,560 | $10,649,996 |
| Georgetown Channel | 569,478 | 1,491,083 |
| Total | 823,038 | 12,141,079 |
| Anacostia River | 358,919 | 21,684,063 |
| Total | 1,181,957 | 33,825,142 |

From the standpoint of value the principal portion of the commerce on the Potomac consisted of general merchandise, the value of this group of commodities being $9,390,160, or more than three-fourths of the total. From the standpoint of tonnage the principal commodities were sand and gravel, 317,038 short tons; coal, 253,375 tons; stone, 82,490 tons; and general merchandise, 58,528 tons. Sand, gravel, stone, and coal are handled largely at the wharves along the Georgetown Channel while general merchandise, fish, oysters, and lumber pass over the wharves on the Washington Channel.

The commerce of 1914 was reported by the Chief of Engineers[b] only for the Anacostia River portion of the harbor. It amounted to 324,504 short tons, valued at $20,702,184, all of which consisted of naval ordnance, powder, and supplies, except 291,809 tons, valued at $815,969. In the year 1913, which was a more nearly normal trade year and is, therefore, preferable for purposes of discussion, all the commerce on the Anacostia except a portion valued at $687,083[c] consisted of naval ordnance and supplies carried in Government vessels between the gun factory at the navy yard and the naval powder factory and proving grounds at Indian Head, Md. The naval powder factory is 29 miles and the proving grounds 24 miles from the navy yard. The tonnage of the naval ordnance, powder, etc., was only 32,236 short tons, but the value of these supplies was $20,996,980; these totals include 9,983 tons, valued at $8,896,424, which were hauled both ways.

[a] Report, Chief of Engineers, U. S Army, 1914, pp. 1890–1895.
[b] Idem, 1915, p. 2289.
[c] Idem, 1914, p. 1890.

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The exclusion of the freight movement between the navy yard and Indian Head would reduce the value of the water-borne commerce at Washington to only $12,828,162, but the tonnage would remain above 1,000,000 tons (1,149,721 tons). The other shipping on the Anacostia consisted largely of sand and gravel, 123,495 tons; stone, 62,508 tons; brick clay, 34,750 tons; brick, 33,532 tons; and coal, 23,377 tons.

**Extent and ownership of water front.**—The total available water frontage, exclusive of canals, is about 18 miles, but only about 2 miles are devoted to commerce, 1 mile being used by steamboat companies, lumber and coal yards, fish companies, etc., and about 1 mile by industrial companies. About 8 miles are set apart for parks and for purposes of the United States.

The Chief of Engineers, United States Army, reports that from the Aqueduct Bridge to the War College the Potomac River has a frontage in the city of Washington of about 47,950 feet. The Federal Government owns about 43,950 feet, or all of this frontage except that in the Georgetown section of the city. Of the 4,000 feet of frontage in the Georgetown section, the Federal Government owns only a few street ends, the Baltimore & Ohio Railroad Co. owning about 130 feet (at the foot of Thirtieth Street NW.), the Chesapeake & Ohio Canal Co. about 500 feet, and various other private interests the remainder.[a]

Two thousand feet of the frontage owned by the Federal Government, the section extending from Rock Creek to the naval hospital, is occupied by squatters. The frontage from the naval hospital to the Engineer Wharf, about 26,200 feet, and, in addition, the entire shore line of the Tidal Basin are used for park purposes and are under the control of the Chief of Engineers, as is also the Engineer Wharf at the foot of Fourteenth Street SW., which has a frontage of about 800 feet and is used as a berthing and landing place for the equipment of the Washington (D. C.) United States Engineer District. The frontage from Fourteenth Street to N Street NW., about 4,600 feet long, is under the jurisdiction of the Commissioners of the District, while the frontage from N Street to the southern limit of Washington Channel, a distance of about 4,675 feet, is occupied by the War College.

Only the lower 2 miles of the Anacostia River is used for commercial purposes. The south bank is entirely undeveloped and the north bank only partially developed. The Federal Government owns practically all of the frontage on the south bank and much of the frontage on the north bank, although the title to a large part of the latter is in dispute.

The frontage along the James Creek Canal is owned largely by the United States. Both sides of the section from N to P Streets NW., a distance of about 1,000 feet, is under lease, while the section from P Street to the mouth of the canal, on Anacostia River, about 3,000 feet in length, extends along the grounds of the War College and Engineer School on one side and along undeveloped property on the other.

**Terminals.**—There are in all 44 regular wharves on the Potomac within the limits of the city of Washington. Many of these wharves

[a] Special Report of Chief of Engineers, U. S. Army, on Water Terminal and Transfer Facilities (H. Doc. No. 226, 63d Cong., 1st sess.), p. 437.

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are used by sand and gravel and asphalt companies, the Columbia Granite & Dredging Co. alone occupying five, the Potomac Sand & Gravel Co. one, and the Cranford Paving Co. two. Several excellent wharves are used for handling coal, such as those occupied by the Washington Gas Light Co., the Capital Traction Co., and the J. Maury Dove Co.

The following is a list of the wharf property owned by the United States, with the name of the lessee September 1, 1915, and the location, water frontage, area, and yearly rental of each parcel:

| Lessees. | Location. | Frontage. | Area. | Rental. |
|---|---|---|---|---|
| POTOMAC RIVER FRONT. | | *Feet.* | *Sq. feet.* | |
| R. M. Allen | Foot of Ninth Street SW | 40 | 2,400 | $70.00 |
| American Ice Co | Water Street between Ninth and Tenth Streets SW. | (a) | 8,522 | 838.64 |
| Samuel Bensinger | Foot of N Street SW | 120 | 7,000 | 460.00 |
| Capital Yacht Club | Foot of Ninth Street SW | 24 | 2,080 | 75.00 |
| James H. Carter & Co | Foot of Thirteenth Street SW | 200 | 26,600 | 1,000.00 |
| L. A. Clarke & Son | Foot of Tenth Street SW | 280 | 45,800 | 1,900.00 |
| Colonial Beach Co | Water Street between M and N Streets SW. | 132 | 8,000 | 500.00 |
| Cranford Paving Co | Foot of Thirty-first Street NW | 53 | ..... | 240.00 |
| J. Maury Dove Co. (Inc.) | Foot of Thirteenth Street SW | 168 | 38,000 | 1,570.00 |
| Do | Foot of G Street NW | 100 | ..... | 120.00 |
| G. W. Forsberg | Foot of Eighth Street SW | 156 | 18,000 | 733.00 |
| W. E. Garner | Foot of Ninth Street SW | 44 | 3,320 | 100.00 |
| Wm. C. Hamburg | Foot of Thirteenth Street SW | 18 | 1,440 | 60.00 |
| Johnson & Wimsatt | Foot of Twelfth Street SW | 190 | 43,500 | 2,244.00 |
| Mount Vernon & Marshall Hall Steamboat Co. | Foot of M Street SW | 125 | 10,000 | 600.00 |
| Norfolk & Washington Steamboat Co. | .....do ..... | 220 | 20,300 | 1,500.00 |
| Do | Foot of Seventh Street SW | 190 | 44,000 | 2,345.00 |
| Potomac & Chesapeake Steamboat Co. | Foot of Eighth Street SW | 198 | 35,600 | 1,596.00 |
| Wm. A. Ragan | Foot of Thirteenth Street SW | 65 | 4,200 | 150.00 |
| Jos. P. Stephenson | Foot of Seventh Street SW | 300 | 59,900 | 2,300.00 |
| Wimsatt & Church | Foot of Ninth Street SW | 80 | 18,000 | 720.00 |
| District of Columbia (municipal fish wharf and market). | Water Street between Tenth and Twelfth Streets SW. | 700<br>126 | 152,100<br>11,015 | ..... |
| District of Columbia (workhouse). | Water Street between H and I Streets SW. | 503 | 87,848 | ..... |
| District of Columbia (fire-boat wharf). | Water Street between N and M Streets SW. | (a) | (a) | ..... |
| District of Columbia (morgue) | .....do ..... | (a) | (a) | ..... |
| District of Columbia (harbormaster's wharf). | .....do ..... | (a) | (a) | ..... |
| United States (site of central heat and power plant.) | Water Street between Thirteen-and-a-half and Fourteenth Streets SW. | 359 | 38,975 | ..... |
| ANACOSTIA RIVER FRONT. | | | | |
| Harry D. Bailey | Old Anacostia Bridge | 81 | (a) | 76.00 |
| C. C. Carlsen | Foot of Fourth Street SE | 50 | (a) | 50.00 |
| Edward S. Dean | Foot of N Street SE | ..... | (a) | 67.50 |
| Eastern Power Boat Club | Old Anacostia Bridge | 93 | (a) | 162.75 |
| Lewis E. Smoot | Foot of Third Street SE | 106 | (a) | 400.00 |
| Standard Oil Co | Foot of Q Street SE | ..... | (a) | 200.00 |
| District of Columbia (sewer division). | Foot of First Street SE | 330 | (a) | ..... |
| United States (Superintendent Capitol and Grounds). | .....do ..... | 40 | (a) | ..... |
| JAMES CREEK CANAL BETWEEN N STREET AND THE ANACOSTIA RIVER. | | | | |
| W. A. Anderson | Part of parcel No. 8 | 127 | (a) | 158.75 |
| Galliher & Huguely | Parcels 5, 7, 9, and 11 | 377 | (a) | 282.75 |
| Robert Murphy | Parcels 1 and 3 | 445 | (a) | 173.50 |
| Henry Raum | Parcel No. 31 | 50 | (a) | 25.00 |
| Mrs. Frieda Rentz | Parcel No. 32 | 25 | (a) | 12.50 |
| William Rentz | Parcels 27, 28, and 29 | 125 | (a) | 62.50 |
| Washington Brick & Terra Cotta Co. | Parcels 2 and 10 | 570 | (a) | 427.50 |
| George C. Taylor | Part of parcel No. 8 | 136 | (a) | 225.00 |

a Not reported.

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**Type of wharf construction.**—The prevailing character of construction and the general condition of the wharves in Washington have been described in the following terms:[a]

> The wharves of Georgetown water front consist of bulkhead landings or narrow pile wharves, extended a little beyond the bulkhead lines. On this section of the front all vessels berth parallel to the bulkhead line. These bulkheads are of timber, stone, and concrete. On the Washington Channel the pier-and-slip system is used and vessels berth either parallel or perpendicular to the bulkhead lines. Here we find pile wharves generally poor in condition and very much in need of repairs. The buildings along the Washington water front are frame structures almost entirely, and are not creditable. * * * Conspicuous as exceptions to the generally out-of-date and ill-appearing structures along the Washington water front are the coal, gravel, and sand bulkhead landings of the Consolidated Coal Co. and L. E. Smoot, the sand and gravel yard of the District of Columbia, and the wharves of the District Naval Militia and the United States Lighthouse Establishment.

**Port administration.**—The port is under the control of the Commissioners of the District of Columbia, who are in charge of the municipal government of the city of Washington. The administrative authority is exercised through a harbor committee designated by the commissioners. This committee consists of the chief clerk of the engineer department, the engineer of bridges, and the harbormaster, who is a lieutenant in the police department.

The powers vested in the commissioners and exercised on their behalf by the harbor committee include (1) the exclusive charge and control of all the water-front property and terminals owned by the United States or the District of Columbia within the District, excepting certain portions which are placed under the immediate jurisdiction of the Chief of Engineers, United State Army; (2) the power to make rules and regulations in regard to the building and repair of wharves, the rental thereof, and the rate of wharfage; and (3) the power to make regulations for all water terminals under private ownership.

All appropriations for the improvement and maintenance of the harbor are made by Congress, one-half being taken from the general revenues of the District of Columbia and one-half from the funds of the United States. Likewise all the revenues from the lease of water-front property, dockage, wharfage, etc., are paid into the Treasury of the United States, one-half being credited to the District of Columbia and one-half to the United States.

The Commissioners of the District have no power to acquire by purchase or otherwise any water-front property without enabling legislation passed by Congress.

**Port charges.**—*Pilotage.*—Pilotage is not compulsory for vessels operating in the Potomac. If a towboat is taken a pilot is not needed, since the captain of the tug is a licensed pilot. If a pilot is engaged, his charges are the same as the charges for pilotage at the port of Baltimore. (See p. 150.)

*Towage.*—At this port the subject of towage charges is of little significance because of the restricted character of its commerce.

*Harbor dues.*—No harbor dues are assessed.

*Dockage.*—The regular lines of steamships occupy docks leased by the month or year. Most of the other boats and barges are accommodated at the wharves of private individuals to whom or by whom

[a] Special Report of Chief of Engineers, U. S. Army, on Water Terminal and Transfer Facilities (House Doc. No. 226, 63d Cong., 1st sess.), pp. 429–430.

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their cargoes are consigned. Oyster boats in the first and second tiers at the municipal wharf pay a dockage charge of $1 a day, while boats in the third and fourth tiers pay a charge of 50 cents per day. Fishing boats pay only a wharfage charge.

*Wharfage.*—At the few private wharves at which transient boats are accommodated no charge is made for dockage, but the following wharfage charges are generally assessed:

| | | |
|---|---|---|
| Coal | per ton | $0.05 |
| Stone | do | .10 |
| Wood | per cord | .15 |
| Lumber | per 1,000 feet | .15 |
| Brick | per 1,000 | .15 |
| Melons | per 100 | .20 |
| Canned goods | per case | .0025 |

At the municipal fish wharf the following charges are levied:

| | | |
|---|---|---|
| Shad, or other large fish | per 100 | $0.20 |
| Herring, or other small fish | per 1,000 | .20 |
| Salted fish in barrels:[a] | | |
| Lots of 1 to 50 barrels | per barrel | .05 |
| 50 to 500 barrels | do | .02 |
| 500 barrels and over | do | .01 |
| Canned goods in cases: | | |
| Lots of 1 to 100 cases | per case | .01 |
| 100 to 500 cases | do | .005 |
| 500 cases and over | do | .0025 |
| Watermelons | per 100 | .20 |
| Cantaloupes | do | .10 |
| Lumber | per 1,000 feet | [b].15 |

## WILMINGTON, DEL.

The city of Wilmington, Del., is located at the junction of Christiania River and Brandywine Creek. The Christiania River empties into the Delaware River about 1¼ miles below Wilmington and 24 miles below Philadelphia.[c]

Christiania River is being improved by the Federal Government under a project that calls for a channel 21 feet deep at mean low water from the Delaware to the pulp works, a distance of about 4 miles, 10 feet deep from the pulp works to Pennsylvania Railroad Bridge No. 4, and 7 feet deep from that bridge to the town of Newport, which is 8¾ miles from the Delaware River. This channel is to be 250 feet wide to the mouth of Brandywine Creek, 200 feet wide from that point to the bridge, and 100 feet wide from the bridge to Newport.[d]

The minimum usable depth on June 30, 1914, was 15 feet at mean low water in the Christiania River from the Delaware to the pulp works and 6 feet from the pulp works to Newport. The Delaware River has a 30-foot channel from Philadelphia to the ocean. The mean rise and fall of tide at Wilmington is 6 feet.[e]

**Railroads.**—Wilmington is served by the Baltimore & Ohio, the Pennsylvania (Philadelphia, Baltimore & Washington division), and the Philadelphia & Reading Railroads.

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[a] Containing not more than 600 fish.
[b] With 15 days' storage allowed.
[c] Coast Pilot, Atlantic Coast, Part V, p. 85.
[d] Report, Chief of Engineers, U. S. Army, 1914, p. 344.
[e] Table of Depths for Channels and Harbors, U. S. Coast and Geodetic Survey, 1913, p. 51.

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**Steamship lines.**—The principal regular line of steamships that call at Wilmington is the Wilson Line of the Wilmington Steamboat Co., which operates passenger and freight boats between Wilmington and Philadelphia. These boats make, as a rule, nine trips daily in each direction. In 1913 the boats of this line made 2,141 round trips.

**Commerce of the port.**—In the calendar year 1913 the domestic commerce of the port of Wilmington amounted to 473,382 short tons, valued at $48,270,363. The foreign commerce amounted to 13,093 short tons, the value of which was not reported. Domestic receipts were 389,359 short tons, while domestic shipments were only 84,023 tons.

The principal classes of commodities in the domestic trade of the port in 1913 are shown in the following tabular statement:[a]

| Commodities. | Short tons. | Value. |
|---|---|---|
| Receipts: | | |
| Hides, ship timber, etc.[a] | 238,507 | $12,502,359 |
| Agricultural products | 48,100 | 1,343,000 |
| Groceries, chemicals, ore, etc | 19,650 | 686,000 |
| General merchandise | 56,885 | 10,777,300 |
| Miscellaneous | 26,217 | 4,671,650 |
| Total | 389,359 | 30,070,309 |
| Shipments[b] | 84,023 | 18,200,054 |
| Grand total | 473,382 | 48,270,363 |

[a] Includes hides, sand, ship timber, cordwood, coal, cotton, piece goods, nitrate of soda, etc.
[b] Includes leather, building material, chemicals, machinery, iron supplies, cotton goods, agricultural products, general merchandise, etc.

The foreign trade consisted of 8,996 short tons of nitrate of soda and 4,097 tons of miscellaneous merchandise.

**Extent and ownership of water front.**—Approximately 55,600 feet of water frontage are available at this port but only about 15,000 feet are in actual use, although 30,000 feet more can be economically brought into use. The city of Wilmington owns about 2,500 feet of frontage; railroad companies, 1,600 feet; steamship company, 400 feet; and industrial companies, about 51,100 feet.

**Terminals.**—The general character of the improved frontage is described in the Annual Report of the Chief of Engineers, United States Army, for 1914 (p. 1836), in the following terms:

> On the west side of the Christiania River there is practically continuous wharfage from the plant of the American Car & Foundry Co. to the Delaware Mills of the Jessup & Moore Paper Co. On the east side there is almost continuous wharfage for about the same distance. The more important wharves are located on the west side. Of the more important wharves those at the foot of Fourth Street, Lombard Street, King Street, French Street, Shipley Street, and Tatnall Street, are owned by the city and leased to private concerns at a nominal rental. The wharf at the foot of Church Street is owned by the city and maintained as a municipal wharf. The Baltimore & Ohio Railroad wharf at the foot of Shipley Street has direct connections with points along the Atlantic seaboard.
>
> There is also considerable wharfage along the Brandywine River, but such wharves are used little except for unloading barges of coal.

Much of the water front, it might be added, is owned by large shipbuilding corporations. Other industrial companies, such as the Pusey & Jones Co., the American Car & Foundry Co., and the Jessup & Moore Paper Co., also occupy large tracts of water-front property.

[a] Report, Chief of Engineers, U. S. Army, 1914, p. 1835.

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**Type of wharf construction.**—All terminals consist of pile and timber wharves that lie parallel to the river.

**Port administration.**—The port is under the control of a board of port wardens and a harbor master. The board of port wardens consists of five members chosen by the city council for terms of five years. The harbor master is chosen for one year by the city council upon the nomination of the port wardens. The harbor master is the executive officer of the board. The only other official employed regularly is the secretary of the board.

The port wardens have power to grant permits for the construction of wharves below low water and to make regulations for policing the harbor. Moreover, plans and specifications for the improvement of private water-front property must be approved by the board.

Apparently the municipality has no power to acquire water-front property for terminals by condemnation proceedings. Funds for improvements can be raised only after the approval of the legislature has been secured. An interesting illustration of this occurred in 1901 when the legislature of the State passed a law authorizing and directing the mayor and council of Wilmington to contribute, under stated conditions, an amount not to exceed $60,000 toward the dredging and general improvement of the harbor, the amount so expended to be paid "as other expenses of the said city of Wilmington are paid."[a]

**Port charges.**—*Pilotage.*—The laws of Delaware provide that the rates of pilotage from the Capes of the Delaware to Wilmington and other points shall be $2 per one-half foot of draft for vessels drawing 12 feet or less and $2.50 per one-half foot for vessels drawing more than 12 feet. The rates of pilotage for outbound vessels are the same as for inbound vessels. Inbound vessels spoken inside of a line drawn from Cape Henlopen Light to Cape May Light are entitled to a deduction of 10 per cent from the above rates.[b] Pilotage is apparently compulsory only in the case of foreign vessels.

*Towage.*—There are no regular rates for towing.

*Harbor dues.*—No harbor dues are assessed at this port.

*Dockage.*—A charge of $0.50 to $1.50 per day is made for docking at public wharves, but the principal vessels have their own wharves or are accommodated at the wharves of the companies or individuals to whom their cargoes are consigned.

*Wharfage.*—No charge for wharfage is made.

## WILMINGTON, N. C.

Wilmington is located on the east bank of the Cape Fear River, 30 miles from the bar at the ocean. The river is now being improved under a project that calls for a channel depth of 26 feet at mean low water and a width of 300 feet in the river and 400 feet across the bar. The mean range of tide is 4½ feet at the entrance to the river and 2½ feet at Wilmington. On June 30, 1914, vessels drawing 26 feet could be carried at high water over the shoalest part of the channel.[c]

Above Wilmington the Cape Fear River is being improved by the Federal Government under a project that calls for the construction of three locks and dams to provide slack-water navigation, with an 8-foot depth of water during all seasons of the year between Wilming-

[a] Act passed Mar. 9, 1901.
[b] Sec. 18 of chap. 449 of the Public Acts of Delaware, 1881, as amended Mar. 8, 1899.
[c] Report, Chief of Engineers, U. S. Army, 1914, pp. 511 and 513.

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ton and Fayetteville, 115 miles above. Improvements completed to June 30, 1914, make it possible for boats drawing 6 feet of water to navigate the river throughout the year to Kings Bluff, 39 miles above Wilmington. As yet, however, the maximum draft that can be carried to Fayetteville at extreme low water is 2 feet, although steamboats make the trip to that point regularly during about nine months of the year.[a]

**Railroads.**—Wilmington is served by the Atlantic Coast Line and Seaboard Air Line Railroads, both of which have extensive terminals on the water front. In addition there is the Wilmington, Brunswick & Southern Railway, which is a small and unimportant line operating to Southport, N. C., a distance of about 25 miles This railroad has no water terminals at Wilmington.

There is no marginal or belt line railroad connecting the piers and the two principal railroads. The terminals of the Atlantic Coast Line and those of the Seaboard Air Line, however, are adjacent and ample facilities are at hand for interchange of cars between these two lines.

**Steamship lines.**—The only regular lines of steamships operating from the port of Wilmington are the Baltimore & Carolina Steamship Co., which operates one boat weekly in each direction between Wilmington and Baltimore; the Clyde Steamship Co., which operates one boat weekly in each direction between Wilmington and New York City; and the Merchants & Farmers' Steamboat Co., which operates one boat weekly in each direction between Wilmington and Fayetteville, N. C.

**Commerce of the port.**—The commercial statistics of the port of Wilmington are compiled with great care and accuracy. This is due largely to the fact that the local office of the United States Army engineer employs two clerks whose sole duty is to keep a record of all the water traffic at the ports and on the streams that are being improved within that district by the Federal Government.

In the calendar year 1913 the commerce at the port of Wilmington amounted to 773,610 short tons, valued at $46,736,713. Of the total traffic, the movement within the harbor and on the river to points above and below Wilmington amounted to 211,414 short tons, valued at $4,353,278. The remaining commerce, 562,196 short tons, valued at $42,383,435 in 1913, consisted largely of foreign trade, as is indicated in the following statement.[b] This statement presents also the totals for 1914, but for purposes of discussion the statistics for 1913 are preferable since 1913 was the more nearly normal trade year.

| Class. | Short tons. | | Value. | |
|---|---|---|---|---|
| | 1913 | 1914 | 1913 | 1914 |
| Foreign: | | | | |
| Imports | 185,833 | 178,345 | $3,718,830 | $3,689,812 |
| Exports | 87,964 | 35,790 | 24,685,694 | 6,217,042 |
| Total | 273,797 | 214,135 | 28,404,524 | 9,906,854 |
| Coastwise: | | | | |
| Inbound | 182,018 | 246,257 | 9,749,541 | 8,525,564 |
| Outbound | 106,381 | 100,188 | 4,229,370 | 6,363,885 |
| Total | 288,399 | 346,445 | 13,978,911 | 14,889,449 |
| Grand total | 562,196 | 560,580 | 42,383,435 | 24,796,303 |

[a] Report, Chief of Engineers, U. S. Army, 1914, p. 511. [b] Idem, p. 2023; idem, 1915, p. 2376.

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Cotton is the principal commodity handled over the wharves of Wilmington; it comprises practically all of the exports. In 1913, 335,466 bales, or 83,193 short tons, of cotton, valued at $24,657,693, were exported from Wilmington. Fertilizer and fertilizer material made up practically the entire volume of foreign import traffic in 1913, the quantity being 185,789 short tons and the value $3,715,780.

In the outward-bound coastwise trade at Wilmington, cotton was the item of greatest value in 1913, over one-third of the total ($1,460,880 out of $4,229,370) being supplied by cotton. In the inward-bound coastwise trade, dry goods valued at $2,889,000, groceries valued at $2,346,500, and hardware valued at $1,623,720 were the principal commodities and constituted more than 70 per cent of the total, in value, of the inward-bound coastwise movement.

**Extent and ownership of water front.**—About 3 miles of frontage are at present available on the east bank, or city side, of the river. On the west bank several miles of frontage could be made available, if required, but the land is mostly low and unused.

The frontage owned by the city of Wilmington consists of a few street ends, practically all of the improved frontage being owned by railroad companies and other private interests. The Seaboard Air Line Railway owns a frontage, measured along harbor lines, of approximately 1,800 feet on the east bank of the river adjacent to the main business district of the city.

The Atlantic Coast Line Railroad owns extensive frontage on both sides of the river. On the east bank adjacent to the property of the Seaboard Air Line Railway this company owns three tracts which have a total direct frontage of 2,023 feet, and on the west bank two tracts with a combined frontage of 2,143 feet.

The Clyde Steamship Co. owns, through the Wilmington Terminal Co., a subsidiary organization, 416 feet of frontage on the east bank of the river.

The Wilmington Compress & Warehouse Co. owns about 450 feet of frontage and the Champion Compress & Warehouse Co. about 600 feet. Both companies are located on the east bank of the river and are controlled by the same interests.

**Terminals.**—The city of Wilmington owns seven wharves, which are located at street ends and have a total frontage of 350 feet. One is used in connection with the waterworks pumping station; another is used by the city fire boats; another is leased to the Champion Compress & Warehouse Co.; while the remaining four are open to the public without charge and are used chiefly by small craft.

The principal terminals are those of the Atlantic Coast Line Railroad, the Champion Compress & Warehouse Co., the Clyde Steamship Co., the Seaboard Air Line Railway, and the Wilmington Compress & Warehouse Co.

The terminals of the Atlantic Coast Line Railroad are located on the east bank of the river. The most northerly tract has a frontage of 980 feet, of which only 133 feet have been improved. On this section are two brick warehouses, which have a combined floor area of 46,000 square feet and are used for general storage.

Another tract on the east side of the river has a direct frontage of 806 feet. The north end of this property faces a narrow slip about 500 feet long, which increases the wharf frontage to about 1,300 feet.

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A general storage warehouse of frame construction occupies a frontage of 44 feet; a coal wharf, 60 feet; an oil dock, 175 feet; and two warehouses of brick construction, 300 feet; while the balance of the frontage is occupied by railroad tracks. The warehouses, or sheds, are one story in height and have an aggregate floor area of about 43,000 square feet. One of the wharves is equipped with a hoisting tower that has a capacity for handling 400 tons of fertilizer materials daily.

The third tract of water-front property on the east side of the river has a frontage of 237 feet and contains 2 two-story brick warehouses which are leased to wholesale merchants.

The Atlantic Coast Line Railroad does not use any of the frontage it owns on the west side of Cape Fear River. One of the tracts, which has an improved frontage of 643 feet, is leased to the American Naval Stores Co. The other tract has a total frontage of about 1,500 feet, but only 430 feet have been improved by wharves. These wharves, three in number, are very old and are in poor condition. No use is now made of them; formerly they were the terminals of the railroads which then reached the city by means of ferries.

The terminals of the Seaboard Air Line Railway adjoin the principal terminals of the Atlantic Coast Line Railroad. Of the 1,800 feet of direct or linear frontage owned by this railroad, about 1,150 feet have been improved. Three slips increase the wharf frontage to 2,355 feet. The approximate dimensions of these slips are as follows: No. 1, length 312 feet, width 120 feet; No. 2, length 460 feet, width 120 feet; No. 3, length 433 feet, width 167 feet.

The terminals of the Seaboard Air Line Railway have six warehouses of frame construction one story in height. The following table shows the floor area of each warehouse:

| Warehouses. | Floor area. | Warehouses. | Floor area. |
|---|---|---|---|
| | *Square feet.* | | *Square feet.* |
| A | 34,876 | E (or Pocomoke) | 25,284 |
| B | 36,473 | Waterland | 9,985 |
| C | 37,186 | | |
| D | 37,030 | Total | 180,834 |

These warehouses are used chiefly for the storage of imported fertilizer material. Three of the wharves are equipped with towers and overhead-tram systems. There are eight towers, each of which has a handling capacity of 400 tons daily. These towers are used for unloading fertilizer or other bulk materials from vessels at the wharves. The material is taken from the hold of the vessel in a scoop bucket lowered and raised by an arm of the tower and is dumped into a barge or scow or into small cars that run on an inclined elevated track into the adjoining warehouse.

The terminal of the Clyde Steamship Co. is of recent construction and comprises a wharf 416 feet long and a 1-story wharf shed 416 feet long and 132 feet wide, with a floor area of 54,912 square feet. This shed is of frame construction, with sheathing of galvanized iron.

The wharf of the Wilmington Compress & Warehouse Co. occupies a frontage of 436 feet. In addition to a frame wharf shed there are

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three warehouses, two of brick and one of frame construction. The combined floor space of wharf shed and warehouses is about 200,000 square feet. One of the brick warehouses is used for the storage of cotton and contains one cotton compress. The other warehouses are used for the storage of fertilizer materials and are equipped with an elevating tower. The terminals are connected with the tracks of the Atlantic Coast Line and the Seaboard Air Line Railroads.

The Champion Compress & Warehouse Co. owns about 600 feet of frontage on the east side of the river. At one end of the property there is a slip 46 feet wide and at the other a slip 53 feet wide, while in the center is a slip about 130 feet in width. This company has two piers, each fronting on the wide slip on one side and on one of the narrow slips on the other. Each pier is about 100 feet wide, one being 350 feet long and the other 425 feet in length. At the head of the main slip is a bulkhead wharf that extends the entire length of the property, and is 30 feet wide. This company owns three large warehouses, one of brick and two of frame construction. These warehouses are used for the storage of cotton and contain three cotton compresses. The terminals are connected by tracks with the Atlantic Coast Line and the Seaboard Air Line Railroads.

A number of wharves are occupied by wholesale grocery establishments, coal companies, and lumber companies.

**Type of wharf construction.**—The prevailing type of construction is that of pile and timber wharves parallel to the main channel or fronting or slips.

**Port administration.**—The administration of the port of Wilmington is vested in a State board called the Board of Navigation and Pilotage for Cape Fear River and Bars. This board, which is appointed by the governor, consists of five members, who serve without compensation for a term of four years. As a rule three of the commissioners are residents of Wilmington and two of Southport.

The commissioners have authority in all matters appertaining to the navigation of the Cape Fear waters. They license and control the pilots and have authority to make regulations and to impose reasonable fines and penalties for the purpose of enforcing their rules and regulations. One harbor master and three port wardens, all of whom are appointed by the board, perform the customary duties of their respective offices.

The board of navigation and pilotage has no control of the several municipal wharves. These wharves were built and are maintained by the municipality and their management is, therefore, one of the duties of the city commissioners.

**Port charges.**—*Pilotage.*—Pilotage is compulsory on the bar and optional from the bar to the city.

The following is the schedule of pilotage charges fixed by the board of commissioners of navigation and pilotage on the bar (from the sea to Southport or vice versa) and on the river (from Southport to Wilmington or vice versa).

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| Draft of vessel. | On the bar. | On the river. | Draft of vessel. | On the bar. | On the river. |
|---|---|---|---|---|---|
| 6 feet and under | $10.76 | $6.46 | 16½ to 17 feet | $57.34 | $34.41 |
| 6 to 7 feet | 13.06 | 7.83 | 17 to 17½ feet | 61.02 | 36.72 |
| 7 to 8 feet | 14.83 | 8.89 | 17½ to 18 feet | 64.05 | 38.55 |
| 8 to 9 feet | 16.09 | 10.01 | 18 to 18½ feet | 67.17 | 40.34 |
| 9 to 10 feet | 21.08 | 12.64 | 18½ to 19 feet | 71.72 | 43.04 |
| 10 to 11 feet | 25.55 | 15.33 | 19 to 19½ feet | 74.96 | 44.99 |
| 11 to 12 feet | 28.58 | 17.14 | 19½ to 20 feet | 78.30 | 46.98 |
| 12 to 12½ feet | 30.30 | 18.18 | 20 to 20½ feet | 82.81 | 49.39 |
| 12½ to 13 feet | 31.84 | 19.11 | 20½ to 21 feet | 87.50 | 52.50 |
| 13 to 13½ feet | 34.15 | 20.49 | 21 to 21½ feet | 93.75 | 56.25 |
| 13½ to 14 feet | 38.01 | 23.35 | 21½ to 22 feet | 100.00 | 60.00 |
| 14 to 14½ feet | 42.74 | 25.64 | 22 to 22½ feet | 106.25 | 63.75 |
| 14½ to 15 feet | 45.08 | 27.04 | 22½ to 23 feet | 114.08 | 68.44 |
| 15 to 15½ feet | 47.17 | 28.30 | 23 to 23½ feet | 121.88 | 73.12 |
| 15½ to 16 feet | 50.32 | 30.19 | 23½ to 24 feet | 131.25 | 78.75 |
| 16 to 16½ feet | 54.13 | 32.48 | 24 to 25 feet | 143.50 | 89.00 |

*Towage.*—The prevailing charge for towing a vessel from the ocean or Southport to anchorage in Wilmington Harbor and return is $0.25 per gross ton for vessels of 300 tons or less and $0.22 per gross ton for vessels of more than 300 tons. The minimum charge is $50. The following table shows the charges for shifting a vessel from dock to dock according to the gross register tonnage of the vessel:

| | | | |
|---|---|---|---|
| Less than 300 tons | $5.00 | 800 to 900 tons | $15.00 |
| 300 to 400 tons | 6.00 | 900 to 1,000 tons | 18.00 |
| 400 to 500 tons | 7.00 | 1,000 to 1,100 tons | 21.00 |
| 500 to 600 tons | 8.00 | 1,100 to 2,000 tons | 40.00 |
| 600 to 700 tons | 10.00 | 2,000 to 2,500 tons | 45.00 |
| 700 to 800 tons | 12.00 | 2,500 to 3,000 tons | 50.00 |

*Harbor dues.*—All vessels of 100 tons net register and over are required to pay the following fees to the harbor master:

| | | | |
|---|---|---|---|
| Steamships: | | Sailing vessels: | |
| 100 to 500 tons | $3.00 | Less than 500 tons | $2.00 |
| 500 to 1,000 tons | 5.00 | 500 to 1,000 tons | 3.00 |
| 1,000 to 1,500 tons | 7.00 | 1,000 tons and over | 5.00 |
| 1,500 to 3,000 tons | 10.00 | | |
| 3,000 tons and over | 12.00 | | |

*Dockage.*—No data are available.

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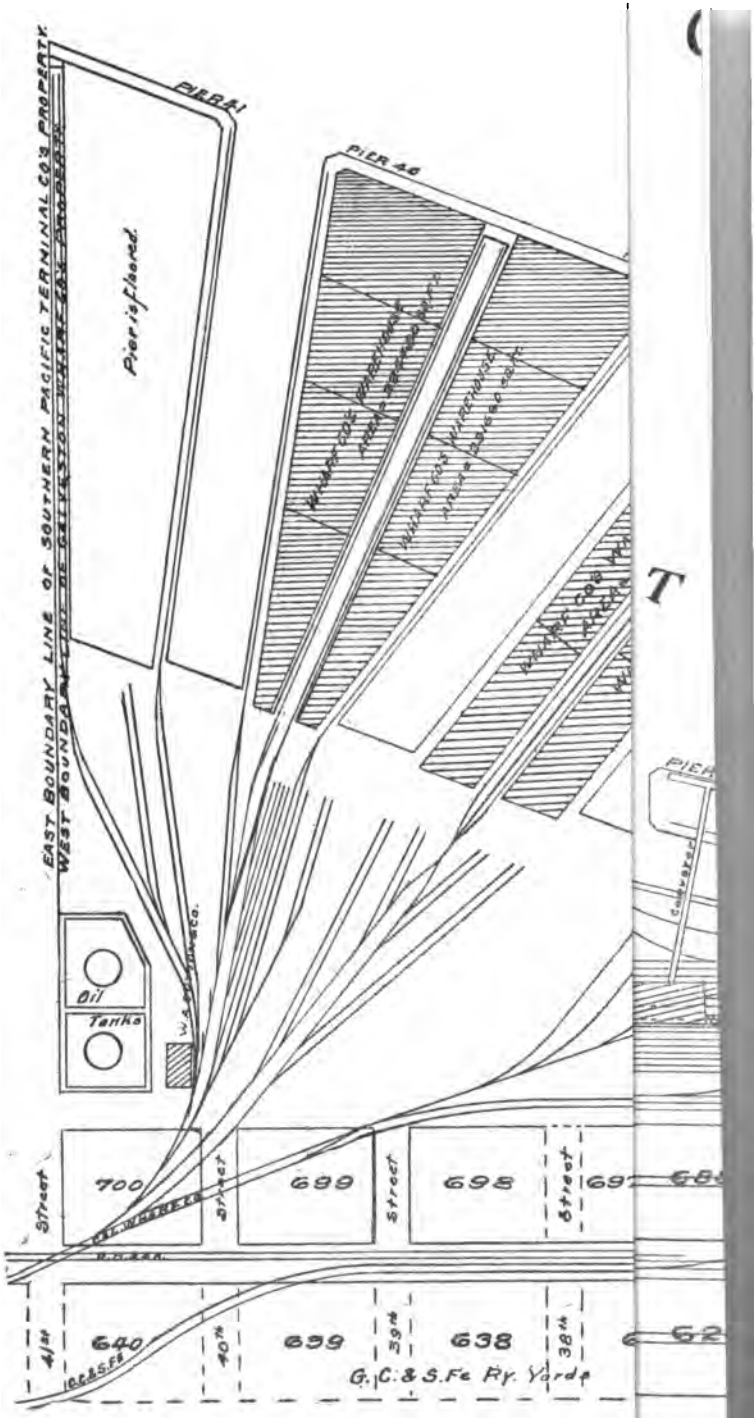


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# CHAPTER III.

## GULF PORTS.

### GALVESTON, TEX.

Among the leading ports of the country in value of foreign commerce and of high rank also in the value of its coastwise trade is the port of Galveston. The harbor lies on the north side of Galveston Island facing Galveston Bay, and is about 410 miles west of Southwest Pass, the principal channel entrance to the port of New Orleans.

On the south, or Gulf of Mexico, side Galveston Island is protected by a concrete sea wall constructed at a cost of over $1,500,000. This sea wall is 17 feet high, 16 feet wide at the base, and more than 5 miles in length, and is considered more than ample to protect the city against a tidal wave such as that which caused great destruction in 1900. On the north side the island is now connected with the mainland of Texas by means of a causeway which was constructed in 1912 and provides two tracks for the steam railroads entering the city and one track for the electric railway connecting Houston with Galveston.

The United States Army Engineers report[a] "that the area of the harbor is now about 258,496 acres, ranging in depth from 24 to 50 feet, of which 79,168 acres is properly the channel from ocean bar to anchorage. Of the remaining 179,300 acres about 119,400 acres are over 30 feet in depth."

The length of the improved channel from the Gulf to its northerly limit is 6 miles. The channel is 1,200 feet wide at its narrowest point, and on June 30, 1914, the maximum draft that could be carried at mean low water from deep water in the Gulf to as far as Forty-sixth Street was 30 feet. The 30-foot channel had on June 30, 1914, the following widths: From the Outer Red Beacon to the end of the tile dike, a distance of approximately 6,350 feet, about 600 feet; thence to Twenty-second Street, about 300 feet; thence to Thirty-fifth Street, about 100 feet for a short distance, and then about 600 to 800 feet as far as the upper end of the Southern Pacific terminals.[b]

"The tidal currents have considerable velocity at the entrance on the bar and along the wharves, and their velocity is increased by northerly and southerly winds."[c]

**Railroads.**—Over the two railroad tracks on the causeway pass the trains of the six following railroads: Galveston, Harrisburg & San Antonio Railway; Galveston, Houston & Henderson Railroad; Gulf, Colorado & Santa Fe Railway; International & Great Northern Railway; Missouri, Kansas & Texas Railway; Trinity & Brazos Valley Railway.

The Galveston, Harrisburg & San Antonio Railway is a part of the Southern Pacific Railway system. The Galveston, Houston & Henderson Railroad is a short line operating between Galveston and Houston. The Gulf, Colorado & Santa Fe Railway is a part of the

[a] Report, Chief of Engineers, U. S. Army, 1913, p. 793.
[b] Idem, p. 797.
[c] Coast Pilot, Atlantic Coast, Part VIII, p. 112.



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Santa Fe system. The Trinity & Brazos Valley Railway is a part of the Chicago, Rock Island & Pacific Railway.

All of these railroads have access to the water front over the rails of the Galveston Wharf Co., an independent corporation, although the Southern Pacific and the Santa Fe Railroads reach their terminals over their own tracks. Access to the Galveston water front is secured also by means of a car ferry that operates between Galveston and Port Bolivar, on the opposite side of Galveston Bay, and is used by the Gulf & Interstate Railroad, a part of the Santa Fe Railroad system.

These two approaches from the mainland have at times proved inadequate for the traffic moving into Galveston, a notable instance having occurred in 1906. This fact was brought out quite forcibly in the report of the Interstate Commerce Commission in an inquiry made in 1913 into the charges and practices of the interstate carriers entering Galveston and Texas City and of the wharf companies serving these ports. The report of the commission states, among other things:

> The Galveston Wharf Co. does not pretend to furnish on Galveston Island terminal or storage facilities ample enough to relieve the bay lines of the obligation also of furnishing terminal facilities. * * * Its facilities, indeed, are said to be so inadequate that if cars were delivered to it indiscriminately the property would be blocked in one or two days. * * * At times the blockade is so serious that carriers must refuse to accept Galveston traffic."[a]

**Steamship lines.**—The following table, compiled from data given in the Exporters' Encyclopedia for 1915, indicates the lines of steamers engaged in foreign trade that call regularly at the port of Galveston:

| Lines. | Sailings. | Ports of destination. | Piers. |
|---|---|---|---|
| Austro-Americana Line [b] | 2 or 3 monthly [c] | Barcelona, Marseille, Trieste, Fiume, Venice. | Pier 37. |
| Booth Steamship Line | do.[c] | Liverpool | Do. |
| Castle Line [b] | do.[c] | Antwerp and Ghent | Piers 36 and 39. |
| Compagnie Generale Transatlantique. | 1 monthly [d] | Havre | Pier 15. |
| Creole Line | 2 monthly [c] | Marseille, Barcelona, Genoa | Do. |
| Globe Line [b] | 3 monthly [c] | Bremen | Pier 40. |
| Do | 1 to 3 monthly [c] | Havre | Do. |
| Hamburg-American Line [b] | 1 to 2 monthly [c] | Hamburg | Piers 36 and 39. |
| Harrison Line | 2 or 4 monthly [e] [c] | Liverpool | Piers 10 and 11. |
| Head Line (Ulster Steamship Co. Ltd.). | 1 or 2 monthly [c] | Belfast | Pier 21. |
| Do | 1 every 5 or 7 weeks.[c] | Dublin | Do. |
| Larrinaga Line | 2 or 3 monthly [c] | Manchester | Piers 36 and 39. |
| Leyland Line | 2 or 4 weekly [d] [f] | Liverpool | Pier 10. |
| Gulf Transport Line | 1 monthly [d] | Havre and [b] Bremen | Do. |
| Lord Line | 1 every 3 weeks [c] | Rotterdam | Piers 36 and 39. |
| New York and Porto Rico Steamship Co. | 1 monthly [c] | Porto Rican ports | Not reported. |
| North German Lloyd Line [b] | 1 or 2 monthly [d] | Bremen | Do. |
| Norway-Mexico Gulf Line | 3 monthly [d] | Christiania, Stavanger, Goteborg. | Pier 36. |
| Pierce-Cotoniera Line | 2 monthly [c] | Barcelona, Genoa, Naples | Pier 21. |
| Pinillos Line | do.[c] | do | Pier 40. |
| Texas Mexican Line | 1 monthly [c] | Havre, Dunkirk | Piers 36 and 39. |
| United Fruit Co | 1 weekly [c] | Ports in Panama, Costa Rica, Guatemala, Honduras. | Not reported. |
| United Steamship Co | 2 monthly [d] | Havana, Santiago, and Cienfuegos (Cuba). | Pier 27. |
| Do | do.[d] | Kingston (Jamaica) | Do. |
| Do | 1 monthly [d] | Matanzas, Manzanillo, and Guantanamo (Cuba). | Do. |
| Do | do.[d] | Port au Prince (Haiti) | Do. |

[a] In the matter of wharfage charges of the Galveston Wharf Co., at Galveston, Tex., 26 I. C. C. Report, pp. 703-704.
[b] Service suspended during war in Europe.
[c] Freight only.
[d] Freight and passenger.
[e] Four monthly during cotton season and two monthly during remainder of year.
[f] During cotton season, and two monthly during remainder of year.

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In the coastwise trade regular sailings are maintained by the Morgan Line, a subsidiary of the Southern Pacific Co., which operates at least three freight steamers weekly between Galveston and New York, the Mallory Line, which operates two freight and passenger steamers weekly between Galveston, Key West, and New York, and the Southern Steamship Co., which operates one boat weekly in each direction between Port Arthur, Galveston, and Philadelphia.

**Commerce of the port.**—Cotton is the principal commodity handled at Galveston, which is the greatest cotton port in the world. In the calendar year 1913 the value of exports from Galveston was $251,470,431, and of this amount the value of cotton constituted more than seven-eighths.

The following summary [a] of the commerce of Galveston for 1913 and 1914 shows that the coastwise as well as the foreign trade is very large:

| Class. | Short tons. | | Value. | |
|---|---|---|---|---|
| | 1913 | 1914 | 1913 | 1914 |
| Foreign trade: | | | | |
| Imports | 725,327 | 846,618 | $9,524,788 | $11,598,140 |
| Exports | 1,798,274 | 2,100,756 | 251,470,431 | 196,172,142 |
| Total | 2,523,601 | 2,947,374 | 260,995,219 | 207,770,282 |
| Coastwise trade: | | | | |
| Inbound | 1,232,916 | 1,350,942 | 89,242,806 | 110,959,505 |
| Outbound | 698,571 | 721,478 | 138,784,788 | 133,255,365 |
| Total | 1,931,487 | 2,072,420 | 228,027,594 | 244,214,870 |
| Grand total | 4,555,088 | 5,019,794 | 489,022,813 | 451,985,152 |

In 1913, which was a more nearly normal trade year, and is, therefore, preferable for purposes of discussion, the outbound traffic, both foreign and coastwise, amounted to 2,496,845 short tons, valued at $390,255,219, while the inbound traffic consisted of 1,958,243 short tons, valued at only $98,767,594. From the standpoint of tonnage the traffic at Galveston is fairly well balanced, the outbound cargoes exceeding the inbound by only about 25 per cent, although the value of the outbound cargoes is nearly four times as great as that of the inbound.

The character of the commodities comprising the commerce of a port is an index to the port itself and determines to a large degree the kind and extent of the terminal facilities required. In this connection it is interesting to present the following summaries of the commerce of Galveston for 1913 and 1914.

[a] Report, Chief of Engineers, U. S. Army, 1914, p. 2292; idem, 1915, p. 2628.



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| Commodities. | 1913 | | 1914 | |
|---|---|---|---|---|
| | Short tons. | Value. | Short tons. | Value. |
| FOREIGN TRADE. | | | | |
| Imports: | | | | |
| Crude oil | 493,203 | $1,702,546 | 581,483 | $2,087,335 |
| Creosote | 59,551 | 760,845 | 38,986 | 557,997 |
| Sugar | 28,350 | 1,127,172 | 36,386 | 1,537,978 |
| Bananas | 65,023 | 696,293 | 50,207 | 567,154 |
| Corn | 26,861 | 642,514 | 75,945 | 1,714,971 |
| Sisal grass | 8,002 | 862,301 | 4,183 | 332,082 |
| Bagging and burlaps | 4,568 | 563,079 | 3,222 | 388,169 |
| Jute, jute bags, and jute bagging waste | 6,596 | 330,877 | 1,567 | 39,176 |
| All other | 33,173 | 2,839,161 | 54,639 | 4,373,278 |
| Total | 725,327 | 9,524,788 | 846,618 | 11,598,140 |
| Exports: | | | | |
| Cotton | 843,775 | 221,507,901 | 710,537 | 145,537,954 |
| Cottonseed cake and meal | 271,201 | 7,884,079 | 151,293 | 4,436,328 |
| Cottonseed oil | 3,715 | 464,112 | 1,219 | 147,066 |
| Wheat | 401,718 | 12,681,517 | 1,080,294 | 39,635,121 |
| Flour | 38,468 | 2,041,112 | 40,796 | 2,162,564 |
| Lumber | 104,183 | 1,371,825 | 59,871 | 853,715 |
| Staves | 39,669 | 1,148,636 | 19,170 | 470,392 |
| All other | 95,545 | 4,371,249 | 37,576 | 2,928,502 |
| Total | 1,798,274 | 251,470,431 | 2,100,756 | 196,172,142 |

| Commodities. | 1913 | | 1914 | |
|---|---|---|---|---|
| | Short tons. | Value. | Short tons. | Value. |
| COASTWISE TRADE. | | | | |
| Receipts: | | | | |
| Miscellaneous | 286,918 | $28,691,800 | 131,005 | $13,100,500 |
| Dry goods | 45,640 | 22,820,000 | [a] 123,752 | [a] 61,876,000 |
| Machinery | 47,908 | 9,581,600 | 42,159 | 8,431,800 |
| Metal, bar and sheet | 39,622 | 3,962,200 | 28,587 | 2,858,700 |
| Iron and steel, manufactured | 15,254 | 3,050,800 | 42,500 | 8,500,000 |
| Steel rails, etc | 36,086 | 1,263,010 | 27,197 | 951,895 |
| Clothing | 12,703 | 6,351,500 | [b] | [b] |
| Canned goods | 34,967 | 4,196,040 | 37,523 | 4,502,760 |
| All other | 713,818 | 9,325,856 | 918,219 | 737,850 |
| Total | 1,232,916 | 89,242,806 | 1,350,942 | 110,959,505 |
| Shipments: | | | | |
| Ore and copper (bullion) | 233,388 | 70,016,400 | 249,609 | 74,882,700 |
| Cotton | 177,590 | 40,173,400 | 161,218 | 34,963,600 |
| Cottonseed meal and cake | 5,073 | 147,117 | 2,052 | 69,508 |
| Cottonseed oil | 6,521 | 815,215 | 100 | 12,500 |
| Wool | 9,628 | 4,814,000 | 12,077 | 6,038,500 |
| Metals | 35,221 | 3,552,100 | [b] | [b] |
| Hides and leather | 6,765 | 1,758,900 | 7,603 | 1,976,780 |
| Lumber | 89,118 | 1,336,770 | 101,903 | 1,528,545 |
| Dried fruits | 6,548 | 1,309,600 | 10,903 | 3,180,600 |
| Rice | 20,348 | 1,012,400 | 17,906 | 895,300 |
| All other | 108,371 | 7,848,886 | 158,107 | 9,707,332 |
| Total | 698,571 | 138,784,788 | 721,478 | 133,255,365 |

[a] Reported as "merchandise, clothing, etc.," in 1914. [b] Not reported separately in 1914.

**Extent and ownership of water front.**—The city of Galveston owns none of the water front now improved and in use. Of the improved frontage the Galveston Wharf Co. is the principal owner. The property of this company, as shown on the map opposite page 207, extends from Tenth to Forty-first Streets and is the most important as regards location. It has a linear frontage of about 2.5 miles and a frontage, including slips, of about 5.9 miles.

The only improved water frontage held by other interests is that of the Gulf, Colorado & Santa Fe Railway Co., which adjoins on the

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east the property of the Galveston Wharf Co. and extends from Fourth to Tenth Streets, and that of the Southern Pacific Terminal Co. adjoining the Galveston Wharf Co. property on the west and extending from Forty-first to Fifty-first Streets.

The Southern Pacific Terminal Co. owns 318 acres of land, of which 215 acres are in active use. The length of water frontage, including that of the two slips owned by this company, is 9,893 feet, of which 6,890 feet are improved.

The Chicago, Rock Island & Pacific Railway Co. owns a section of unimproved frontage adjoining on the west the property of the Southern Pacific Terminal Co. and extending from Fifty-first to Fifty-seventh Streets.

**Terminals.**—On the property of the Galveston Wharf Co., as shown by the map facing page 207, there are 11 slips, one of which, at the foot of Sixteenth Street, is used for marine ways. Three other slips are irregular in shape and are used mainly for the "mosquito fleet." The remaining seven slips have the following dimensions:

| Location of slips. | Length, east side. | Length, west side. | Average width. |
|---|---|---|---|
| At foot of— | *Feet.* | *Feet.* | *Feet.* |
| Twelfth Street | 1,163 | 1,125 | 180 |
| Thirteenth and Fourteenth Streets | 900 | 788 | 263–375 |
| Fifteenth Street | 600 | 675 | 225 |
| Thirty-fifth Street | 750 | 900 | 225 |
| Thirty-eighth Street | 1,200 | 1,200 | 205 |
| Thirty-ninth Street | 1,235 | 1,235 | 180 |
| Fortieth Street | 1,200 | 1,200 | 188 |

The wharves of the Galveston Wharf Co. are improved by the following warehouses:

| Location. | Area. | Character of construction. | Use in March, 1915. |
|---|---|---|---|
| | *Sq. feet.* | | |
| Pier 10 | 204,225 | Frame [a] | Cotton. |
| Pier 11 | 88,806 | do.[a] | Do. |
| Pier 12 | 80,814 | do.[a] | Army supplies. |
| Pier 15 | 88,558 | do.[b] | Cotton. |
| Piers 16 and 18 | 106,722 | do | Do. |
| Pier 20 | 13,650 | do | Bananas. |
| Pier 21 | 76,175 | do | Do. |
| Pier 22 | 13,632 | do | Fish. |
| Piers 23–26 | 241,684 | do | Cotton and general merchandise. |
| Pier 27 | 48,061 | do | Do. |
| Piers 29–33 | 221,097 | do.[b] | Cotton. |
| Pier 35 | 75,860 | do.[b] | Do. |
| Pier 36 | 239,600 | do.[b] | Do. |
| Pier 37 | 143,880 | do.[a] | Do. |
| Pier 38 | 143,880 | do.[a] | Do. |
| Pier 39 | 231,660 | Concrete | Do. |
| Pier 40 | 224,480 | do | Do. |
| Pier 41 | (c) | do | Do. |

[a] With concrete fire walls.
[b] With one concrete side wall and iron sheathing.
[c] Under construction.

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The warehouse on Pier 12 is leased to the Quartermaster's Department of the United States Army, for a supply depot; the warehouses on Piers 20 and 21, to the United Fruit Co.; that on Pier 22, to the Gulf Fisheries Co.; those on Piers 23 to 27, to the Mallory Steamship Co.

The Galveston Wharf Co. owns two grain elevators, one having a capacity of 1,600,000 bushels and the other 650,000 bushels. In addition, there is a sacking elevator with a daily capacity of 6,000 bushels. On or adjacent to the company's property are to be found most of the industries in the city.

The wharf company also has 44 miles of track which connects with all the railroads entering the city. The wharf company moves with its own motive power all cars destined for its piers and requires that all cars turned over to it must be classified and delivered in pier lots, that is, all cars going to a specified pier must be placed together and the pier and berth designated on cards. The switching charges to and from junctions with connecting lines is $1.75 per car except for incoming traffic for delivery at Galveston or for cars.

The Galveston Wharf Co. was established in 1854 and until 1898 operated the only water terminals in Galveston.[a] It is a private corporation and is not owned or controlled by any railroad or steamship company. One of the largest stockholders is the city of Galveston, which received some years ago in return for a cession of its title to street ends on the wharf company's property, 6,222 shares of stock, or 24 per cent of the total. This holding entitles the city to two of the seven representatives on the board of directors, but the city does not have a controlling voice in the management of the affairs of the company.

The company has been quite prosperous and now has $2,626,000 outstanding in capital stock and $3,000,000 in bonds. The Interstate Commerce Commission reported in May, 1912, that the "wharf company has paid dividends each year for 40 years; during that time they have averaged 4.34 per cent; during the last five years the dividends have been 5 per cent. In addition the earnings have been sufficient to enable it to add to its property and to make improvements to the extent of about $2,000,000 and to set up a liberal sinking fund to meet its bonded indebtedness at maturity."[b]

The property of the wharf company was valued at $10,275,955.89 by the Railroad Commission of Texas in a report made November 30, 1911, and it is claimed that new construction valued at more than $1,000,000 has been added since that time.

The property of the Gulf, Colorado & Santa Fe Railway Co., although well located and valuable, is unimproved except for a small slip used by the car ferry operating between Galveston and Port Bolivar, the latter being the principal Gulf Coast terminal of the Santa Fe system.

The wharves of the Southern Pacific Terminal Co. are improved by frame warehouses. In addition, there is under construction a concrete grain elevator of 1,000,000 bushels capacity to replace one destroyed by fire in 1914. The wharves of this company are used chiefly by the Morgan Line, which is engaged in coastwise trade to

[a] In the matter of wharfage charges of the Galveston Wharf Co. at Galveston, Tex., 23 I. C. C. Reports, p. 537.
[b] Idem, p. 546.

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New York and is a subsidiary of the Southern Pacific Co. Pier B is used exclusively, and Pier A in part, by the ships of this line. Foreign ships taking grain and cotton also use Pier A.

A warehouse on this company's property is leased by the Carnegie Steel Co. of Texas for storing various steel products. In addition, an oil company has a pipe line, storage tanks, and a pumping station on these terminals.

**Type of wharf construction.**—The wharves are built on creosoted piles with timber platforms. The wharf line frontage has been greatly increased by the excavation of slips.

**Port administration.**—There is practically no port administration at Galveston. The city has no direct interest in or control over the harbor. The only administrative authority that has anything to do with the harbor is the harbor master, who performs the customary duties of that office.

**Port charges.**—*Pilotage.*—The following schedule of pilotage rates, per foot of draft and classified according to the gross register tonnage of the vessel, is fixed by the pilots' association:

| | |
|---|---|
| 1,500 tons and over | $4.00 |
| 1,000 to 1,500 tons | 3.75 |
| 500 to 1,000 tons | 3.50 |
| Less than 500 tons | 3.00 |

*Towage.*—The usual charge for towage is $35 for one tug and $50 for two. The charge for shifting a vessel in the harbor ranges from $10 to $35.

*Harbor dues.*—No harbor dues are assessed at the port of Galveston.

*Dockage.*—Assignment of regular berths at the wharves of the Galveston Wharf Co. are made yearly, the minimum charge being $1,000 per annum. Although regular berths are assigned, the company reserves the right to use any space not in use by the party to whom assigned. For each berthing the following charges are made:

| | |
|---|---|
| 5,000 tons or more | $175.00 |
| 3,000 to 5,000 tons | 150.00 |
| 2,000 to 3,000 tons | 125.00 |
| Less than 2,000 tons | 25.00–100.00 |

*Wharfage.*—The wharfage charges of the Galveston Wharf Co. are indicated on page 37, where the wharfage charge for a typical vessel at a number of ports on the Atlantic, Pacific, and Gulf coasts is shown in comparative form.

## HOUSTON, TEX.

Houston is situated on Buffalo Bayou, which is connected with deep water in Galveston Harbor by means of the Houston Ship Channel. The channel has a minimum depth of 25 feet from Bolivar Roads to the turning basin just below the city of Houston proper, a distance of 50 miles, and of 8 feet from the turning basin to the foot of Main Street in Houston, a distance of 7 miles. The channel has a bottom width of 150 feet across Galveston Bay to Morgan Point, and of 100 feet from Morgan Point to the turning basin, which is 600 feet wide on the bottom.

The amount appropriated to July 1, 1914, for the improvement of Buffalo Bayou and the construction of the Houston Ship Channel was

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$5,777,866.29,[a] of which $1,250,000 was provided by the Harris County Houston Ship Channel navigation district, in compliance with a requirement of the river and harbor act of June 25, 1910. This navigation district was created by the Legislature of Texas and on January 11, 1911, was authorized by popular vote to issue bonds for $1,250,000.

**Railroads.**—The following are the railroads serving the city of Houston: (1) Beaumont, Sour Lake & Western Railway; (2) Galveston, Harrisburg & San Antonio Railway; (3) Galveston, Houston & Henderson Railroad; (4) Gulf, Colorado & Santa Fe Railway; (5) Houston & Texas Central Railroad; (6) Houston, East & West Texas Railway; (7) International & Great Northern Railway; (8) Missouri, Kansas & Texas Railway; (9) St. Louis, Brownsville & Mexico Railway; (10) San Antonio & Aransas Pass Railway; (11) Texas & New Orleans Railroad; and (12) Trinity & Brazos Valley Railway.

Lines Nos. 1 and 9 belong to the St. Louis & San Francisco Railroad system; Nos. 2, 5, 6, and 11 are parts of the Southern Pacific Railway system; No. 4 is part of the Santa Fe Railroad system; No. 12 is owned jointly by the Colorado & Southern and the Chicago, Rock Island & Pacific Railroads; while Nos. 3 and 10 are small local lines.

All of the above-mentioned railroads are connected with the Houston Belt & Terminal Railway, which circles the city and is owned and operated jointly by the "Frisco Lines" and the Santa Fe system. The harbor board plans to operate its own system of tracks to connect all the terminals on the water front with the belt line.

**Steamship lines.**—The port of Houston is new and largely undeveloped and only one regular line of steamships makes this a port of call.

On August 10, 1915, the Southern Steamship Co. instituted a service between Houston and New York with one sailing in each direction every 10 days. For several years prior to 1914 the Houston Direct Navigation Co., a subsidiary of the Southern Pacific Co., operated several barges between Houston and Galveston for the movement of export cotton. Formerly the freight rate on cotton shipped from interior points in Texas to Houston was 6 cents per 100 pounds lower than the rate for similar service to Galveston, which permitted a profit to the barge line, but on September 10, 1914, the Railroad Commission of Texas abolished this differential and made the rate to Galveston the same as that to Houston. The opportunity of the barge line was thereby destroyed, and it is very probable that its service will not be restored under the present system of rates.

The Houston Ship Channel and Buffalo Bayou are now used chiefly by small craft that deliver wholesale merchandise from Houston to points on the numerous connecting bayous and rivers and return with rice for the mills in Houston.

**Commerce of the port.**—The only complete statistics of the commerce of the port of Houston are to be found in the reports of the United States Army Engineers, which indicate that the water-borne trade increased from 104,907 short tons in 1905 to 1,860,452 tons in 1913. The following table shows the quantity and volume of the principal commodities handled in the calendar years 1913 and 1914: [b]

[a] Report, Chief of Engineers, U. S. Army, 1914, p. 2300.
[b] Idem, 1914, p. 2301; idem, 1915, p. 2638.

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| Commodities. | 1913 | | 1914 | |
|---|---|---|---|---|
| | Short tons. | Value. | Short tons. | Value. |
| Cotton | 96,000 | $24,000,000 | 38,400 | $9,216,000 |
| Groceries and provisions | 36,000 | 3,600,000 | 37,000 | 3,700,000 |
| Lumber and shingles | 200,000 | 3,000,000 | 183,000 | 3,660,000 |
| Hardware and machinery | 25,000 | 2,500,000 | 23,000 | 2,300,000 |
| Rice | 40,000 | 2,000,000 | 42,000 | 2,100,000 |
| Grain and feed | 37,000 | 740,000 | 38,000 | 760,000 |
| Oil and gasoline | 14,000 | 740,000 | 16,000 | 844,800 |
| Fuel oil | 95,352 | 667,464 | 81,000 | 486,000 |
| Sand and shell | 1,270,000 | 840,000 | 530,000 | 393,000 |
| All other | 47,100 | 681,000 | 32,300 | 922,900 |
| Total | 1,860,452 | 38,768,464 | 1,070,700 | 24,382,700 |

In 1913, which was the more nearly normal trade year, and is, therefore, preferable for purposes of discussion, cotton constituted more than three-fifths of the total commerce of the port, measured by value, and was handled almost exclusively by the barges of the Houston Direct Navigation Co., operating between Houston and Galveston. Sand and shell formed more than two-thirds of the total tonnage.

With the elimination of the cotton movement by water, the most valuable part of the commerce of the port is lost and temporarily the port suffers. In view, however, of the large quantity of cotton compressed at points along the ship channel or otherwise handled in Houston for export, the city hopes by means of the improved channel and the new terminal now in course of construction to attract ocean-going vessels. The new industries that are being established along the channel will also contribute toward the development of the port.

The character of the craft using the Houston Ship Channel is indicated in the following statement for the calendar year 1913:[a]

| Class of vessels. | Number of vessels.[a] | Net register tonnage. | Number of passengers. |
|---|---|---|---|
| Registered: | | | |
| Steam | 73 | 1,320 | 30,100 |
| Barges | 18 | 3,500 | ..... |
| Unregistered | 52 | 8,200 | ..... |
| Total | 143 | 13,020 | 30,100 |

[a] All American.

**Extent and ownership of water front.**—The length of the water front at the harbor proper (the turning basin) is between 7,500 and 10,000 feet. Of this frontage the city owns 3,900 feet on the south side and about 3,000 feet on the north side of the basin, various private individuals and corporations owning the balance. In addition, the city owns considerable frontage on the upper channel, which is the 7-mile section between the turning basin and the foot of Main Street in the city proper. The city has a total frontage of more than 4 miles.

[a] Report Chief of Engineers, U. S. Army, 1914, p. 2301.

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On the lower channel extending southward from the turning basin it has been estimated that at least 32 miles of water front are available for terminal development. Wharves are to be found at the present time at Clinton, Harrisburg, La Porte, and Lynchburg and a few other points on the ship channel.

Terminals.—The only wharf of importance in Houston proper is on Buffalo Bayou at the foot of Main Street and is owned by the city. It is cheaply constructed and has a small frame shed. It has neither rail connection nor handling equipment and is used only by light-draft boats. A large sand and shell business is done at this wharf, the material being brought from points on the San Jacinto River and in Galveston Bay.

At the turning basin, 7 miles below Main Street, two slips 150 feet wide and 500 feet long were dredged when the channel was constructed. Since, however, no bulkheads or wharves have been constructed, the slips have filled in considerably.

At an election held in November, 1914, a bond issue of $3,000,000 for the construction of adequate water terminals was authorized by the voters of the city proper. The plans call for the construction, under the supervision and control of the harbor board, of modern wharves and warehouses with proper switching tracks and modern handling appliances.

The first unit of the new terminals has been recently (September, 1915), completed, and is located on the south side of the ship channel just east of Mackie Dee Avenue, where the city owns a tract of 10 acres with a channel frontage of 3,900 feet. This unit includes a longitudinal wharf 645 feet in length and 50 feet wide, and a one-story reinforced concrete warehouse, 416 feet long and 100 feet wide. The wharf and warehouse are connected by a spur track with the International & Great Northern Railway.

The second and third units have already been contracted for and work on them is now under way. The second unit will consist of one 3-story reinforced-concrete warehouse 500 feet long and 135 feet wide, with a 25-foot reinforced-concrete apron and wharf. The third unit will consist of one 3-story reinforced-concrete warehouse 600 feet long and 135 feet wide, also with reinforced-concrete apron and wharf 25 feet wide. The city also has contracted for the construction of three cotton sheds, which it is expected will be completed October 1, 1915. Each of these sheds will be 750 feet long and 125 feet wide and each shed will be equipped with modern conveyors and handling appliances. Adjoining these wharves and warehouses, the city is constructing another warehouse 175 feet long by 100 feet wide, with a creosoted-timber apron and wharf. The warehouse will be three stories in height.

The city owns more than 260 acres at and surrounding the turning basin and a large portion of these holdings will be divided into factory sites to be offered to manufacturers on favorable terms.

At Clinton, 8 miles from Houston, the Houston Direct Navigation Co. owns a timber wharf with a frame warehouse. Until the cotton season of 1914–15, cotton from interior points was brought to this wharf by rail and transported thence by barge through Buffalo Bayou and Galveston Bay to Galveston. A portion of this wharf is leased to rice companies, rice being brought here by barge from various points and shipped by rail to Houston and other points.

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At Constitution Bend, about 1 mile above Harrisburg, the International & Great Northern Railroad has a small wharf which is equipped with modern handling machinery and is, according to reports of the United States Army Engineers, very efficient. [a]

In addition, there are small and unimportant wharves at La Porte and Lynchburg as well as Harrisburg. A number of the cotton-compress companies that are located on the ship channel have loading chutes for transferring cotton to barges for shipment to Galveston.

**Type of wharf construction.**—The wharves are pile and timber bulkhead structures that are parallel to the channel.

**Port administration.**—The administration of port affairs is vested in the Harbor Department of Houston, which was created by city ordinance of December 1, 1913, consists of a board of five commissioners and the mayor, and is known as the Board of Harbor Commissioners. The members of the board, who serve without compensation, are appointed by the mayor subject to confirmation by the city council. They serve for a term of two years, three members retiring every 12 months. The president of the board is designated by the mayor, the vice president is selected by the board from their own number, and the secretary is selected by the board but must not be a member of it. The city engineer is ex officio the harbor engineer.

The jurisdiction of the board is limited to the city of Houston proper. All of the municipal terminals are within the corporate limits of the city, and the city has police jurisdiction over the channel from the foot of Main Street to Morgan Point. The board has complete charge of the construction, maintenance, and operation of the wharves and terminals erected by the city, and of the dredging and improvement of the channel. The city, acting through the harbor department, has the right of eminent domain and has power also to make and enforce rules and regulations regarding the use and control of the entire water front, the anchoring, mooring, towing, docking, etc., within the city, as well as the establishment and collection of dockage and wharfage at the terminals owned or controlled by the city.

The ordinance creating the board requires that all revenues derived from the wharves and water-front property of every kind shall be kept separate and apart from the other moneys of the city in a fund to be known as the Harbor Revenue Fund, but no expenditure can be made by the board without previous authorization by the city council.

The only active administrative officer at present is the wharf master, who supervises the commerce handled at the Main Street Wharf and whose salary is paid out of the general funds of the city.

**Port charges.**—*Pilotage.*—The pilotage charges are not regulated, but the harbor board plans "to furnish licensed pilots at nominal cost to ships demanding the same."

*Towage.*—At the present time a flat rate of $100 is made for towing a vessel in one direction between Bolivar Roads, in the Gulf of Mexico, and Houston. The harbor department is arranging

[a] Special Report of Chief of Engineers, U. S. Army, on Water Terminal and Transfer Facilities (H. Doc. No. 226, 63d Cong., 1st sess.), p. 860.

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to inaugurate a municipal towing service which, it is expected, will provide lower rates.

*Harbor dues.*—No harbor dues are assessed at the port of Houston.

*Dockage and wharfage.*—No charge for dockage or wharfage is made for the use of any of the municipal terminals.

## MOBILE, ALA.

The city of Mobile is situated on the west bank of Mobile River and is connected with the Gulf of Mexico by a channel 33½ miles in length. This channel extends through Mobile River for a distance of 5 miles and through Mobile Bay for the remainder of the distance. On June 30, 1914, the channel had a minimum usable depth at mean low water of 26½ feet. The mean range of tide at the entrance to the bay is 1.1 feet and at the city about 14 feet.[a]

The Mobile River is formed by the junction of the Tombigbee and Alabama Rivers. The Black Warrior, or Warrior, River is a tributary of the Tombigbee. A considerable district is, therefore, reached by the Mobile River and its tributaries. The Mobile River is navigable at mean low water for vessels of about 14 feet draft up to the head of navigation, about 45 miles above Mobile.[b]

For a number of years appropriations have been made for a series of locks and dams on the Black Warrior and Tombigbee Rivers to provide 6-foot slack-water navigation throughout the year as far as Saunders Ferry and Nicholas Shoals, 443 miles and 423 miles, respectively, from the city of Mobile. This project was completed in April, 1915. It is probable that an important coal traffic will be developed between the coal fields of the Warrior Basin and the Gulf of Mexico. In fact, a fleet of self-propelled steel barges, each of 1,000 tons capacity, has for several years been transporting coal from these fields to New Orleans.

**Railroads.**—Mobile is served by the Alabama, Tennessee & Northern, the Louisville & Nashville, the Mobile & Ohio, the New Orleans, Mobile & Chicago, and the Southern Railroads.

Between the Southern Railway and the Mobile & Ohio Railroad there is a close working arrangement and practically common ownership. The terminals of these companies are the best railroad terminals at Mobile and are used jointly by both railroads.

The Louisville & Nashville Railroad owns about 1 mile of the commercial water front, much of which is well located but is not in active use. This railroad is interested primarily in the port of Pensacola as its Gulf terminal and consequently has done comparatively little to improve its terminals at Mobile.

The New Orleans, Mobile & Chicago Railroad, nominally at least a part of the Frisco Lines (St. Louis & San Francisco Railroad) owns a large water frontage at this port, but only a small portion has been improved. This line entered Mobile only in recent years and has not as yet developed a large traffic for this port. It has been found, moreover, that the Louisville & Nashville Railroad has an equal interest with the St. Louis & San Francisco in the ownership of a majority (55.92 per cent) of the stock of the New Orleans, Mobile &

[a] Report, Chief of Engineers, U. S. Army, 1914, p. 678.
[b] Idem, p. 687.

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Chicago Railroad.[a] This fact may account in part for the failure to improve the terminal property of the last-named railroad.

The Alabama, Tennessee & Northern Railway is a consolidation of the Tombigbee Railroad Co., the Alabama, Tennessee & Northern Railroad Co., and the Mobile Terminal & Railway Co. These lines combined have over 225 miles of railroad, extending from Mobile to the coal fields in the Birmingham district in northern Alabama. This is a new system and has, as yet, developed only a small traffic.

No marginal or belt-line railway is to be found at Mobile. The lack of proper coordination between the several railroads and the various terminals appears to be the greatest deficiency in the facilities at this port.

In the case of the Mobile Chamber of Commerce et al. *v.* Mobile & Ohio Railroad Co. et al.,[b] decided November 30, 1914, the Interstate Commerce Commission found that—

> The Mobile & Ohio and the Southern interchange shipments and switch from one dock to the other * * * as expediency and facility of traffic demand, but such interchange will not be effected between these defendants and the independent dock and the city wharves. It appears from the record that it is very desirable that all carriers should cooperate in the operation of these docks so that all freight for a certain ship can be accumulated as far as possible at one dock. * * * That this sort of an arrangement may be effected it is necessary that the carrier shall establish a uniform switching system at a uniform rate.

This case deals particularly with the terminal situation at Mobile and was instituted by the Mobile Chamber of Commerce for the purpose of removing several serious obstacles in the way of the development of the port. In view of the fact that this case illustrates the means by which the logical and proper development of a port can be retarded by private interests, it is instructive and it has been deemed proper to give the following summary of the grounds of complaint in this case:

1. That defendants Mobile & Ohio Railroad Co. and Southern Railway Co. prefer certain favored steamship lines in connection with through billing and publish rates applicable only to wharves reached by their rails.
2. That through bills of lading are refused to and in connection with vessels not berthing at such wharves and that these defendants refuse to establish rates for the transportation of cotton from points served by their lines to wharves in Mobile located on the rails of other railroad companies and refuse to issue through bills to any steamship line berthing at wharves not reached by their rails.
3. That defendant Louisville & Nashville Railroad Co. issues through bills of lading from points served by it for the transportation of cotton through Pensacola, Fla., in preference to Mobile.
4. That defendants and their connections fail and refuse to issue through bills in connection with all responsible steamship lines upon telegraphic or written directions by the steamship agent to the foreign freight agent of the defendant or the agent of the carrier at point of origin.
5. That defendant Mobile & Ohio Railroad Co., Southern Railway Co., and Louisville & Nashville Railroad Co. have not established separate terminal charges, applicable at Mobile, for the movement of cotton from or to their points of interchange with each other or from the various wharves located within the switching limits of Mobile.
6. That these defendants have not established and published their charges for transportation of cotton from various points served by them to the Mobile depot or

[a] Report of Interstate Commerce Commission on the Financial Relations, Rates, and Practices of The Louisville & Nashville R. R. et al., 33 I. C. C. Reports, p. 215.
[b] 32 I. C. C., pp. 272-282.

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station proper nor the charges for the movement of cotton from the Mobile depot or station proper to all wharves located within the switching limits of Mobile.

7. That the rates charged from points of origin to compress points on uncompressed cotton and the rates on compressed cotton from compress points to the ports are unreasonable. That the rates charged to compress points are "penalty rates."

8. That the defendants apply rates to Mobile that are much greater for the service performed than the rates charged from the same points to Savannah, an equal or greater distance; that the Mobile rates are therefore discriminatory.

9. That defendants apply a less rate from Memphis to Mobile than is contemporaneously charged from intermediate points, and a consequent violation of the fourth section is alleged.

10. That defendants have refused to establish through routes and joint rates applicable from many points in Mississippi, Tennessee, Alabama, Georgia, and Florida to Mobile on export cotton.

Practically all of the contentions of the complainant, the chamber of commerce, were sustained by the commission, which held, for instance, that "the adjustment of these export cotton rates from points of origin to Mobile are unjustly discriminatory to the prejudice of that port as compared to the respective rates of the port of Savannah." The commission held further that "certain conditions exist with respect to the billing of cotton by the defendant, Louisville & Nashville Railroad Co., through Pensacola, which are inimicable to the best interests of all concerned."

The commission also ordered that "carriers serving Mobile with tracks reaching any of the wharves or docks shall establish a uniform switching system, with a uniform rate of 3 cents per 100 pounds for the switching of cotton for export from the point of interchange to such dock or wharf served by their lines." Another ruling of the commission in this case was that through bills of lading should be issued by the originating rail carrier when the dock at Mobile at which delivery is desired is specified.

It is understood that the Mobile & Ohio Railroad and the Southern Railway have arranged to comply with the orders of the commission by making open ship-side delivery to all wharves within the switching limits of Mobile of all freight moving under ship-side rates, both export and import. The Louisville & Nashville and the New Orleans, Mobile & Chicago Railroads have followed this practice for some time. The result should be a better coordination of terminal facilities at Mobile, as well as a larger use of all the existing wharves and docks. The commission has apparently made it possible for a shipper on the lines of the Southern and the Mobile & Ohio Railroads to designate a wharf at Mobile other than one controlled by these carriers. Tramp steamers and independent lines are also enabled to make a fuller and more convenient use of the facilities of this port.

**Steamship lines.**—The following is a list[a] of the principal lines of steamships engaged in foreign trade that call regularly[b] at Mobile:

[a] Compiled from the Exporters' Encyclopedia for 1915, pp. 1078–1085.
[b] Except as suspended owing to the war in Europe.

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| Lines. | Sailings. | Ports of destination. |
|---|---|---|
| Atlantic, Gulf & Far East Line | 1 monthly [a] | Aden, Singapore, Manila, Hongkong, Shanghai, Kobe, Yokohama. |
| Atlantic & Mexican Steamship Co | 2 monthly [b] | Progreso, Mexico. |
| Gans Steamship Line | do.[a] | Bremen. |
| | 1 monthly [a] | Hamburg. |
| | do.[a] | Rotterdam. |
| Hamburg-American Line | do.[a] | Hamburg. |
| Harrison-Leyland Line | 2 monthly [a] | Liverpool. |
| Hubbard-Zemurray Steamship Co | 1 weekly [b] | Honduran ports. |
| Kyle Line | 1 monthly [a] | Greenock, Glasgow. |
| Manchester Liners | do.[a] | Manchester. |
| Markley, Miller & Co | do.[b] | Frontera, Vera Cruz, Laguna, Mexico. |
| Mobile Liners Service | do.[a] | Havre. |
| | 1 weekly [b] | Havana, Cienfuegos, Isle of Pines. |
| | 2 monthly [a] | Mantanzas, Caibarien, Cienfuegos. |
| Munson Steamship Line | 1 monthly [a] | Cardenas, Sagua la Grande, Guantanamo, Manzanillo. |
| | do.[a] | Montevideo, Buenos Aires, Rosario. |
| Orr-Laubenheimer Co. Steamship Line | 2 monthly [b] | Ports in Guatemala and British Honduras. |
| Seeberg Steamship Line | do.[b] | Kingston and Jamaica outports. |
| | 1 monthly [b] | Martinique, Kingston, Port au Prince. |
| | 1 or 2 monthly [b] | Guadeloupe, Martinique, Barbados, Trinidad. |
| United Fruit Co. Steamship Lines | 1 weekly [b] | Ports in Guatemala, Panama, Costa Rica, Honduras. |

[a] Freight only. [b] Freight and passengers.

In the coastwise and local trade of the port of Mobile the principal lines are the Mallory Steamship Co., which operates one steamer weekly in each direction between Mobile, Tampa, Key West, and New York, and the Pensacola, St. Andrews & Gulf Steamship Co., which operates one boat weekly in each direction between Mobile, Pensacola, St. Andrews, and other points in northwestern Florida.

**Commerce of the port.**—A summary of the water-borne commerce of Mobile in the calendar years 1913 and 1914 is shown in the following statement:[a]

| Commodities. | Short tons. | | Value. | |
|---|---|---|---|---|
| | 1913 | 1914 | 1913 | 1914 |
| Cotton and cotton products | 78,951 | 49,805 | $20,040,714 | $11,941,282 |
| Lumber and timber products | 988,585 | 996,139 | 10,548,622 | 9,953,673 |
| Miscellaneous merchandise | 93,155 | 113,560 | 7,182,470 | 11,353,580 |
| Breadstuffs | 56,138 | 52,967 | 2,664,731 | 2,399,713 |
| Manufactured goods | 28,859 | 29,266 | 2,076,848 | 1,233,613 |
| Hog products | 8,791 | 8,566 | 1,923,166 | 1,451,633 |
| Naval stores | 36,335 | 31,908 | 1,586,354 | 972,188 |
| Sisal grass | 11,810 | 52,244 | 1,398,890 | 4,815,354 |
| Bananas | 121,596 | 112,441 | 1,246,616 | 1,256,325 |
| Hay and grain | 44,806 | 50,547 | 1,179,257 | 1,750,168 |
| All other | 128,274 | 271,014 | 1,457,211 | 3,483,083 |
| Total | 1,597,300 | 1,768,457 | 51,304,879 | 50,610,612 |

In the calendar year 1913, which was the more nearly normal trade year, and is, therefore preferable for purposes of discussion, the value of the foreign trade passing through this port was $40,964,453, or about four-fifths of the total value of the water-borne commerce of the port.[b] The value of the exports was $37,463,585.

[a] Report, Chief of Engineers, U. S. Army, 1914, pp. 2184–85; idem, 1915, p. 2523.
[b] Idem, 1914, pp. 2184–85.

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Cotton is the principal commodity handled over the wharves at Mobile and constituted nearly 40 per cent of the commerce of the port in 1913. Mobile is the fourth cotton-shipping port of the United States. Lumber and timber products were also exported in large quantities in 1913.

**Extent and ownership of water front.**—A water frontage of about 8 miles is available for terminals. About 4 miles have been improved, 3 miles on the west side of the Mobile River and about 1 mile on the east side. The principal terminals are on the west bank, or city side. There is no rail line on the east bank, "although a projected railroad is now being built on the eastern shore of Mobile Bay which, when completed, will probably cause the development of improved water terminals and transfer facilities on that bank."[a]

The city of Mobile owns a small section of the water front. Railroads own some important portions and private interests also have considerable frontage.

**Terminals.**—The city of Mobile owns one wharf, which is close to the wholesale business district. This wharf is 1,500 feet long and has a modern steel shed 1,240 feet long and 100 feet wide, in addition to a frame shed 100 feet long and 70 feet wide. The wharf is connected by spur track with the rails of the Mobile & Ohio and the Southern Railroads and is used almost exclusively by the steamboats plying on the Tombigbee and Alabama Rivers, Mississippi Sound, and Mobile Bay.

The most important and active terminals are those of the Mobile & Ohio Railroad and the Southern Railway. Together these railroads control 4,284 feet of improved water front and, through the Mobile Docks Co., a subsidiary of the Mobile & Ohio Railroad, 1,000 feet of unimproved front. All of this frontage is on the west bank of Mobile River toward the northern limits of the city.

The following statement contains a list and description of the wharves owned and occupied by the Mobile & Ohio and the Southern Railroads:

| Wharves or piers. | Dimensions of wharves or piers. | | Dimensions of warehouses. | | | | Construction of warehouses. |
|---|---|---|---|---|---|---|---|
| | Length. | Width. | Length. | Width. | Height. | Area. | |
| | *Feet.* | *Feet.* | *Feet.* | *Feet.* | *Stories.* | *Sq. feet.* | |
| No. 1..... | 770 | ..... | 80 | 770 | 2 | 122,400 | Frame with sheet-iron sheathing. |
| No. 2..... | 520 | ..... | 610 | 121 | 1 | 73,566 | Frame, concrete floor. |
| | | | 340 | 75 | 1 | 29,000 | Brick. |
| No. 3..... | 400-440 | 350 | (a) | (a) | 2 | 105,000 | Frame. |
| No. 4..... | 395-405 | 178 | 375 | 108 | 1 | 40,500 | Frame with iron sheathing. |
| No. 5..... | 347-405 | 131 | 360 | 38 | 1 | 13,700 | Frame. |
| No. 6..... | 350-430 | 140 | 470 | 105 | 1 | 50,400 | Frame with iron sheathing. |
| No. 7..... | 435-440 | 65 | 270 | 35 | 1 | 9,450 | Not reported. |
| No. 8..... | 425-445 | 150 | 495 | 90 | 2 | 89,100 | Frame with iron sheathing. |

[a] Not reported.

Terminals Nos. 1 and 2 are wharves that parallel the river and all of the others are piers. Between Wharf 2 and Pier 3 there is a slip 140 feet wide; between No. 3 and No. 4, a slip 120 feet wide; and between

[a] Special Report of Chief of Engineers, U. S. Army, on Water Terminals and Transfer Facilities (H. Doc. No. 226, 63d Cong., 1st sess.), p. 771.

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No. 4 and No. 5, one 108 feet in width; while between Piers 5 and 6, Piers 6 and 7, and Piers 7 and 8 there are slips 90 feet in width.

Wharf 1 is used chiefly for the banana trade, vessels of the United Fruit Co. landing at this wharf. This wharf is equipped with three modern locomotive banana conveyors, electrically operated. These conveyors, which are the property of the United Fruit Co., are of the same style as those in use in New Orleans and Galveston. The tracks of the Mobile & Ohio Railroad extend to the edge of this wharf, and it is therefore possible to load bananas almost directly into the refrigerator cars.

The larger warehouse on Wharf 2 is used for cotton, while the smaller one is used for fertilizer. Pier 3 has a depressed track in the center, extending the entire length. The warehouse on this pier is equipped with modern electrical apparatus for handling fruit to and from the second floor. Pier 4 has two depressed tracks in the center, extending the entire length of the warehouse.

Pier 5 has, in addition to a small frame warehouse, a coal trestle from which cargo as well as bunker coal is handled directly from cars to vessels by means of endless-belt conveyors. Immediately in the rear of Pier 7 is a grain elevator of 250,000 bushels capacity, which is equipped with a grain conveyor extending over Pier 7, but this elevator is no longer in use and is in a state of disrepair.

Practically all of the regular lines of steamers operating from the port of Mobile use the terminals of the Mobile & Ohio Railroad and the Southern Railway. Traffic agreements have been entered into between the railroads and the ocean carriers by which certain berths on particular piers are designated for the accumulation of cargoes and for the preferential use of each line.

The Louisville & Nashville Railroad owns several parcels of land fronting on Mobile River, but uses little frontage for railroad terminals. One of the two most valuable tracts has a river frontage of 900 feet and a depth of about 300 feet and is leased to the Mobile Coal Co. The other has a frontage of 1,500 feet and is provided with a small banana warehouse and an open frame shed 500 feet long and 50 feet wide. This wharf is used chiefly for bananas that are unloaded by hand. Although the wharf is well located, it is used to only a small fraction of its capacity.

Several miles north of One Mile Creek, which is the northern limit of the improved channel and water front, the Louisville & Nashville Railroad owns an undeveloped frontage of 1,440 feet and still farther to the north owns another undeveloped tract with 942 feet frontage.

The New Orleans, Mobile & Chicago Railroad terminals are located on the west bank of Mobile River at the southern extremity of the city. The property occupied by these terminals has a frontage of about 1,200 feet on Mobile River and a large frontage, also, on Mobile Bay, along which the water is very shallow. Only a small part of this frontage has been developed. Two narrow piers have been built. One pier, known as No. 3, is 1,000 feet long and 75 feet wide. The outer end of this pier, for a distance of 300 feet, is used as a United States lighthouse depot. The other pier is 700 feet long and only 40 feet wide. The outer end of this pier is used by the Texas Co. for the storage of oil, while the remainder is used mainly for discharging lumber into the water to be rafted and carried to vessels in the harbor.

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That these terminals of the New Orleans, Mobile & Chicago Railroad have not been improved to any large extent is due chiefly to the fact that the companies controlling this road are interested primarily in the development of other ports where they have more extensive and costly terminals, the Frisco System being interested in the port of New Orleans and the Louisville & Nashville in that of Pensacola.

The Cochrane System, through the Mobile Terminal & Railway Co., owns large tracts of land on both sides of the Mobile River. One tract is on the west bank at the northern limit of the city and has a river frontage of 700 feet with an average depth of about 1,800 feet. This frontage is improved by one pier. The other tract, which has a very large acreage, is on the east bank of the river and has a frontage of about 11,354 feet.

A considerable portion of the water front at Mobile is owned by various private interests, the most important of these being the Turner-Hartwell Docks Co. The property of this company has a linear water frontage of about 4,000 feet on the west bank of the river and is improved by two slips. The main slip is 205 feet wide and 1,700 feet long on the south side and 1,650 feet long on the north side and is dredged to a depth of 28 feet. The other slip is 500 feet long, but this is being filled to make ground for a new warehouse. On the north side of the main slip are fireproof warehouses, which have been constructed on concrete foundation with steel frames, galvanized-iron sides, and floors of vitrified brick. Double tracks extend on both sides of these warehouses.

The pier on the south side of the main slip is used primarily as a lumber and timber wharf, and is therefore largely an open wharf. It has, however, a frame shed, or warehouse, 50 feet wide and 100 feet long, for the storage of ties, staves, etc.

The wharves of the Turner-Hartwell Docks Co. are connected by tracks with both the Louisville & Nashville and the New Orleans, Mobile & Chicago Railroads. They are well located, of excellent construction, and well equipped to handle a much larger volume of traffic. At the present time the chief commodities handled are lumber and timber products.

In addition to this frontage on the west side of the river the Turner-Hartwell Docks Co. has a wharf 675 feet long on the east side of the river at its mouth. This wharf is used occasionally for the accumulation of lumber, etc., brought down the river in barges for foreign shipment.

Several parcels of water-front property are used by fish and oyster companies. A considerable frontage is owned by several dry-dock companies, the H. Ollinger & Bruce Drydock Co. using 1,200 feet on the east bank of the river and the Gulf Drydock Co. 674 feet on the west bank. A frontage of about 1,000 feet on the east bank is owned by the Henderson Iron Works Co., which company also is engaged chiefly in marine repairs.

Various parcels on the west bank, or city side, and well located are unimproved or not in use. Among these tracts are the following: One of 300 feet frontage to the south of the Turner-Hartwell docks, one of 631 feet frontage to the north of the Turner-Hartwell docks, and one of 830 feet frontage formerly occupied by the Hieronymus Docks & Lumber Co., but unused since 1913, when the plant of this company was destroyed by fire.

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A considerable frontage is occupied by several coal companies. A large bunker-coal trade is now carried on at the port of Mobile and this trade, it is expected, will increase rapidly when traffic on the Black Warrior and Tombigbee Rivers is developed as a result of improvement of these rivers.

Reference has already been made to the coal trestle and conveyor on Pier 6 of the Mobile & Ohio Railroad. Cars are pushed up on the inclined trestle and the coal dumped into a bin from which it is carried by buckets attached to an endless-belt conveyor to chutes that carry it into the vessel.

Among the other companies on the water front that sell bunker coal is the Mobile Coal Co. This company leases from the Louisville & Nashville Railroad a wharf with a frontage of 900 feet. This wharf is equipped with mechanical facilities for discharging coal from cars into vessels and from vessels into bins, this equipment making it possible to load vessels with bunker coal at the rate of 1,000 tons per day of 12 hours. Warehouses for the storage of cement are also located on this wharf.

At the plant of the Ollinger & Bruce Drydock Co. facilities are at hand for docking vessels up to 390 feet in length, 18-foot draft, or 4,000 tons capacity. The Gulf Dry Dock Co. has two slips on which marine railways are operated, one accommodating vessels not exceeding 100 feet in length and the other vessels up to 230 feet in length and not exceeding 1,300 tons dead weight.

**Type of wharf construction.**—The prevailing type of construction is that of open pile-and-timber piers, but a considerable portion of the improved frontage consists of pile-and-timber wharves parallel to the river.

**Port administration.**—The administration of the port of Mobile, so far as the municipal government is concerned, is vested in the city commissioners, one of whom is assigned to the department of public works and has direct supervision and control of the wharves of the city. The harbor master, who serves also as a port warden, and two other port wardens are selected biennially by a board consisting of the mayor and the presidents of the chamber of commerce, the cotton exchange, and the board of underwriters, as provided in sections 4901–4957 of the Code of Alabama, 1907. The port wardens act also as pilot commissioners.

The harbor master is assisted by three deputy harbor masters who superintend the mooring and movement of vessels in the harbor. The master of a vessel may perform this service for himself, but if it is performed by a deputy harbor master, a fee of from $5 to $10 is generally charged. The harbor master himself is paid a regular salary by the city and county jointly.

The municipal wharves are in charge of a superintendent and an assistant superintendent of wharves who are salaried officials appointed by the city commissioners. The superintendent receives a salary of $1,800 per annum and the assistant $720.

The present (August, 1915) session of the Alabama Legislature has passed an act giving the city of Mobile the power to issue bonds for the construction of additional port facilities. It is reported that a bill is pending before the legislature providing for the creation of a State harbor commission to administer the port of Mobile.



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**Port charges.**—*Pilotage.*—The following charges for pilotage are made at this port:

| Draft of vessel. | Rates per foot of draft. | Draft of vessel. | Rates per foot of draft. |
|---|---|---|---|
| 9 feet or less | $2.50 | 12½ to 14 feet | $3.50 |
| 9½ to 10½ feet | 3.00 | 14½ to 20 feet | 5.00 |
| 11 to 12 feet | 3.25 | 20½ feet and over | 6.00 |

Pilotage is optional with vessels drawing 7 feet or less that are engaged in domestic trade between Mobile and other ports on the Gulf of Mexico.

*Towage.*—For square-rigged sailing vessels the prevailing rate for towing from sea or bay to city and return to bay or sea is 35 cents per register ton and for steamers 10 cents per register ton from bay to city or from city to bay; for schooners the following rates are charged for towing both ways:[a] Two hundred and forty tons and less, $60; 241 to 500 tons, 25 cents per ton; 501 tons and over, 30 cents per ton.

In addition to the above charges for towing, the following charges are made for shifting vessels in Mobile Harbor, that is, for assisting inbound vessel to dock, for moving vessel from one berth to another, or for assisting outbound vessel from dock to river channel:

| Net register tonnage. | Shifting less than 1 mile. |
|---|---|
| Less than 1,500 tons | $15 |
| 1,500 to 3,000 tons | 25 |
| 3,000 tons and over | 30 |

*Harbor dues.*—No harbor dues are assessed at this port. Where a deputy harbor master superintends the mooring or shifting of a vessel within the harbor he is paid a fee ranging from $5 to $10. The acceptance of this service is, however, purely optional with the master of the vessel.

*Dockage.*—No charges are made by the Mobile & Ohio Railroad or the Southern Railway against steamers for the privilege of berthing at the wharves of these companies. This is true as regards tramp or irregular steamers as well as regular steamers. The only charge made is a wharfage charge assessed against the cargo. No fixed or annual charge is made for the assignment of a special berth or special space at the wharves of these companies. No dockage charge is made against vessels occupying berths at the Turner-Hartwell docks or at any private wharf.

In regard to dockage charges at the municipal wharves, an ordinance of the city of Mobile dated December 22, 1908, provides as follows:

1. Ten dollars per day will be charged to any steamboat, vessel, barge, or flat occupying any wharf or slip (under control of the superintendent of wharves) while not actually engaged in receiving or discharging cargo, unless permission for free occupation and use of such property is obtained from the superintendent of wharves.

[a] Including one shift

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2. Passenger steamers plying between Mobile and eastern shore points of Mobile Bay will be charged a dockage of, maximum, $25 and, minimum, $10 per month, in lieu of wharfage, and will not be assigned to any regular berth, but will hold themselves in readiness to land or move to any place the superintendent may assign them as necessity demands.

3. Any steamboat, vessel, barge, or flat discharging its cargo on a wharf other than the city wharves and then using a city wharf for receiving cargo will be charged a dockage of $25 per trip.

*Wharfage.*—At the municipal wharf no wharfage is charged on the cargoes of outbound river steamers. The cargoes of inbound river steamers are charged at the following rates:

| | |
|---|---|
| Cotton, per bale | $0.08 |
| Cotton seed, per bag | .0075 |
| Rosin, per barrel | .03 |
| Turpentine, per barrel | .03 |
| Lumber, per 1,000 feet | .20 |
| Wood, per 1,000 feet | 1.00 |
| Staves, per 1,000 pieces | .25 |
| Cattle, per head | .15 |
| Hogs, per head | .03 |
| Sheep, per head | .03 |

In regard to wharfage charges at railroad wharves the following statement is believed to be fairly descriptive:[a]

By far the majority of the tonnage that is handled moves to and from Mobile on a specific export or import rate which is published to apply to or from ship side and includes the absorption of all expenses necessary to make ship-side deliveries. There are exceptions to this application where the rates to and from Mobile do not include delivery to ship side, notably on lumber, timber, and other forest products from certain territory east of the Mississippi River and south of the Ohio River; a wharfage charge of one-half cent per 100 pounds is assessed by the Mobile & Ohio Railroad Co. and 20 cents per 1,000 superficial feet by the Southern Railway for the passage of such traffic over the wharf properties. On import traffic the principal exceptions to this rule are pyrites ore and German potashes, on which a charge of 25 cents per ton of 2,000 pounds when in bulk and 20 cents per ton of 2,000 pounds when in sacks is assessed, covering wharfage, including the expenses of handling, in addition to the rate from Mobile. Wharfage charges are also assessed on traffic destined to or moving from Mobile proper; that is to say, merchants and industries located within the Mobile & Ohio and Southern Railway. These charges are nominal in character and average about 1 cent per 100 pounds.

A new tariff of wharfage charges has recently been issued by the Mobile & Ohio Railroad and the Southern Railway which makes the maximum charge three-fourths of a cent per 100 pounds instead of the average charge of 1 cent per hundredweight which prevailed when the above statement was made.

At the wharves of the Turner-Hartwell Docks Co. the wharfage charge is 1½ cents per 100 pounds on all commodities except those shown in the following statement:

| | | |
|---|---|---|
| Bagging | per 100 pounds | $0.02 |
| Barrels, empty | each | .02 |
| Bran | per 100 pounds | .01 |
| Brick | per 1,000 | .25 |
| Brooms | per dozen | .02 |
| Cement | per 100 pounds | .01 |
| Coffee | do | .01 |
| Cotton | do | [b].03 |
| Cottonseed-meal cake and hulls | do | .01 |
| Crockery | do | .02 |
| Fertilizer material, in bulk | per 2,000 pounds | .25 |

[a] Special report of Chief of Engineers, U. S. Army, on Water Terminal and Transfer Facilities (H. Doc. 226, 63d Cong., 1st sess.), p. 790.

[b] Includes wharfage, handling, storage, and switching.

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| | | |
|---|---|---|
| Fruits: | | |
| Bananas, plantains | per car | $2. |
| Lemons, limes, oranges, pineapples | per box or crate | . |
| Grain and grain products | per 100 pounds | . |
| Hay | do | . |
| Iron, pig and pipe | per 2,240 pounds | . |
| Jugs | per car | 4. |
| Laths and shingles | do | 5. |
| Do | per 1,000 | . |
| Live stock: | | |
| Horses | per head | . |
| Steers and cows | do | . |
| Calves, hogs, sheep | do | . |
| Logs and round piling | per 100 pounds | a. |
| Lumber, crossties, sawn and hewn timber | per 1,000 feet b. m. | . |
| Machinery: | | |
| Packages of less than 1,000 pounds | per 100 pounds | . |
| Packages 1,000 to 4,000 pounds | do | . |
| Packages 4,000 to 10,000 pounds | do | . |
| Packages over 10,000 pounds | do | Spec |
| Naval stores: | | |
| Rosin | per barrel | . |
| Turpentine | do | . |
| Oil | per 100 pounds | . |
| Packing-house products | do | . |
| Salt | do | . |
| Sisal, imported | per bale | . |
| Staves | per 100 pounds | . |
| Stills and worms | do | . |

## NEW ORLEANS, LA.

New Orleans ranked second among the ports of the country value of foreign trade in the year ended June 30, 1914, and high al in the value of its coastwise and local trade. Its chief distinction a port, however, is the fact that it has attained a high degree success in the public ownership and operation of port facilities.

New Orleans is situated on the north bank of the Mississippi Riv about 95½ miles above the ends of the jetties. From the city to th Head of the Passes, about 84 miles below, the river has a least widt of 1,800 feet and a clear and unobstructed channel from 36 to 23 feet deep. This section of the river has been described in the follow ing terms:[b]

> The land on both sides of the river is low and generally marshy; levees, protected b willows, prevent floods when the river is high. The land back of the levees is lai out in sugar and rice plantations and is considered one of the richest agricultural dis tricts in the United States. A sailing vessel bound up the river should employ towboat, as the river is crooked and the current usually has too great a velocity t make any headway against it, except with a strong fair wind. Freshets, which occu from April to July, do not interfere with the navigation of the river.

The Mississippi empties into the Gulf of Mexico through several mouths, or passes, which begin to diverge at a point called Head of the Passes, about 12 to 15 miles from the Gulf.

The most important of these passes is the Southwest Pass, through which a channel 1,000 feet wide and 35 feet deep at mean low water is now being dredged. At the present time (August, 1915) a channel 31 feet deep has been secured.[c]

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a Minimum charge of $1 per car.
b Coast Pilot, Atlantic Coast, Part VIII, p. 98.
c Supplement, issued June 12, 1915, to third edition of Part VIII of Coast Pilot, Atlantic Coast.

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South Pass was until recent years the principal entrance channel. This channel is about 300 feet wide and has a depth of 28 feet over the bar with much deeper water inside.

Between the Head of the Passes and the city of New Orleans there are a number of canals which afford passage for luggers and small power boats from the river to Breton Sound and to the network of bayous, lakes, and bays west of the Mississippi Delta. The draft taken through most of these canals is about 4 feet, and the traffic consists largely of general merchandise shipped to the settlements along their banks and of farm produce, fish, and oysters brought to the markets of New Orleans. The most important of these canals is the Lake Borgne Canal, which enters the Mississippi about 10 miles below Canal Street, New Orleans, and is owned and operated by a private corporation. The draft taken through this canal is about 6 feet.

Among the most important lakes in the vicinity of New Orleans are Lakes Pontchartrain and Borgne, which form the approach to the city of New Orleans from Mississippi Sound. Lake Borgne is a tidal lake about 23 miles long and from 5 to 10 miles wide.[a] Its general depth is 7 to 9 feet, while 8 feet is the deepest draft of any vessel entering. This lake is connected with the Mississippi River by means of Lake Borgne Canal, described above, and with Lake Pontchartrain by means of the Rigolets, a deep passage about 7½ miles long and from 1,350 to 4,200 feet wide.[a]

Lake Pontchartrain is about 36 miles long and 22 miles wide at its widest part. The general depth ranges from 10 to 16 feet, but at its eastern end, near the Rigolets, and at the western end, near the entrance to Lake Maurepas, there are bars over which the depth is about 5 feet. A draft of 7½ feet can be taken into Lake Pontchartrain by steamer when the water is high, but the average draft is 5 to 5½ feet.[b]

The south shore of Lake Pontchartrain forms a part of the boundary of the city of New Orleans, with which it is connected by two canals. The New Canal is about 5½ miles long and 7½ feet deep and is comparatively straight. The Old Canal is crooked and has a depth of about 6 feet in the middle.[c]

The port of New Orleans, as defined by statute,[d] includes all of the parish of Orleans and those portions of Jefferson and St. Bernard Parishes which are adjacent to the Mississippi River.

**Railroads.**—New Orleans is served by the following trunk-line railroads: The Illinois Central, the Louisiana Railway & Navigation Co., the Louisville & Nashville, the New Orleans & Northeastern, the New Orleans Great Northern, the St. Louis & San Francisco (Louisiana Southern & New Orleans, Texas & Mexico divisions), the Southern (via New Orleans & Northeastern), the Southern Pacific, and the Texas & Pacific railroads. In addition there are several short railroads, including the New Orleans Southern & Grand Isle Railway, which are of minor importance.

The port is served by two terminal or harbor belt-line railroads, namely, the Public Belt Railroad and the railroad of the New Orleans

[a] Inside Route Pilot, Key West to New Orleans, U. S. Coast and Geodetic Survey, 1914, p. 79.
[b] Idem, p. 81.
[c] Idem, p. 82.
[d] Sec. 2668, U. S. Rev. Stat.

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Terminal Co. The latter operates 26 miles of main track and 37 miles of sidings and yard tracks in the city of New Orleans and owns and operates extensive water-terminal facilities at Port Chalmette for freight, in addition to a passenger-terminal station in New Orleans. Both terminals are used by the St. Louis & San Francisco lines, the Southern Railway, and the Queen & Crescent Route, the latter two participating through their control of the New Orleans & Northeastern Railroad.

The line of the New Orleans Terminal Co. extends northerly from its freight terminal at Port Chalmette, by way of connection with the Louisville & Nashville Railroad and the New Orleans & Northeastern Railroad, to its passenger terminal in the city of New Orleans, and thence to connections with the Illinois Central system.

The company is controlled by the Southern Railway Co. through the ownership of $1,997,000 out of $2,000,000 capital stock.[a]

**Steamship lines.**—The number of vessels entered in the coastwise and foreign trade of the port in the year ended June 30, 1914, was 2,124, with a total gross tonnage of 6,251,043 and an average gross tonnage of 2,943. The following table shows the number of ships that entered the port, classified as to character of cargo on the inward and outward trips:[b]

| Class of vessels. | Number. | Class of vessels. | Number. |
|---|---|---|---|
| Inward: | | Outward: | |
| Fruit | 672 | General | 1,583 |
| General | 553 | Ballast | 488 |
| Ballast | 309 | Oil | 19 |
| Transit | 143 | Lumber and staves | 14 |
| Sugar | 111 | Lumber | 6 |
| Oil | 98 | Transit | 5 |
| Lumber | 91 | Sugar | 4 |
| Steel | 52 | Salt | 2 |
| Coffee | 42 | Coal | 2 |
| Molasses | 28 | Grain | 1 |
| Creosote | 12 | | |
| Asphalt | 3 | Total | 2,124 |
| Coal | 3 | | |
| Phosphate rock | 2 | | |
| Steel | 2 | | |
| Passenger | 1 | | |
| Pyrites | 1 | | |
| Rosin | 1 | | |
| Total | 2,124 | | |

The gross register tonnage and cargo tonnage of the vessels engaged in foreign and coastwise trade that entered the port in the year ended June 30, 1914, classified by general character of lines, is shown in the following table:

[a] Poor's Manual of Railroads, 1915, p. 1905.
[b] Report of Ford, Bacon & Davis, engineers for Board of Port Commissioners on Analysis of Present Operations of the Port of New Orleans, Vol. II, p. 8.

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| Lines. | Register tonnage. | | Cargo tonnage. | | Ratio of cargo tonnage to register tonnage. |
|---|---|---|---|---|---|
| | Amount. | Per cent. | Amount. | Per cent. | |
| General Atlantic lines: | | | | | |
| Primary importance | 2,237,196 | 35.8 | 2,188,831 | 42.6 | 0.98 |
| Secondary importance | 674,128 | 10.8 | 584,377 | 11.4 | .86 |
| Total | 2,911,324 | 46.6 | 2,773,208 | 54.0 | .95 |
| South American and Mexican lines | 1,426,158 | 22.8 | 719,696 | 14.0 | .50 |
| Coastwise and insular possessions lines | 1,222,771 | 19.6 | 955,770 | 18.6 | .78 |
| Smaller lines | 182,157 | 2.9 | 217,670 | 4.3 | 1.19 |
| All other lines [a] | 508,633 | 8.1 | 467,335 | 9.1 | .92 |
| Grand total | 6,251,043 | 100.0 | 5,133,679 | 100.0 | .82 |

[a] Includes lines or boats paying wharfage to Board of Port Commissioners and those paying harbor fee only. (See section on port charges, p. 241.)

The following statement shows the steamship lines engaged in the foreign trade that call regularly at the port of New Orleans, together with the number of sailings, ports of destination, and character of service of each:

| Lines. | Sailings. | Ports of destination. | Service. |
|---|---|---|---|
| American Fruit & Steamship Co. | 2 weekly | Fronteras and Tobasca (Mexico). | Freight. |
| Do | 3 monthly | do | Passenger. |
| Atlantic, Gulf & Far East Line. | 1 monthly | Ports in Japan, China, Philippines, India. | Freight. |
| Austro-Americana Steamship Co.[a] | 2 or 3 monthly | Barcelona, Marseille, Venice, Trieste, Fiume. | Do. |
| Atlantic Fruit Co | 1 weekly | Nicaraguan ports | Do. |
| Do | do | Honduran ports | Do. |
| Do | do | Mexican ports | Do. |
| Bluefields Fruit & Steamship Co. | do | Bluefields (Nicaragua) | Freight and passenger. |
| Do | 2 monthly | Cabo Gracias (Nicaragua) | Do. |
| Compagnie Générale Transatlantique. | do | Havre | Do. |
| Creole line | 2 or 3 monthly | Genoa | Freight. |
| Elder-Dempster Line | 1 monthly | Liverpool, Rotterdam | Do. |
| Gans Steamship Line | 2 or 3 monthly | Rotterdam | Do. |
| Hamburg-American Line [a] | 2 monthly | Hamburg | Do. |
| Harrison Line | 1 weekly | Liverpool | Do. |
| Head Line | 3 or 4 monthly in winter, 1 monthly in summer. | Belfast | Do. |
| Do | 1 weekly in winter, 1 every 7 weeks in summer. | Dublin | Do. |
| Holland-America Line | 1 every 3 weeks | Rotterdam | Do. |
| Independent Steamship Line | 2 weekly | Honduran ports | Freight and passenger. |
| Lamport & Holt Line [a] | 2 monthly | Antwerp | Freight. |
| Leyland Line | 4 monthly | Liverpool | Do. |
| Do | 1 monthly | London | Do. |
| Do | do [a] | Antwerp | Do.[b] |
| Maclay-Prentice Line | 1 monthly in winter, 1 every 6 to 8 weeks in summer. | Glasgow | Do. |
| Mexican Navigation Co | 1 every 10 days | Vera Cruz and Tampico (Mexico). | Freight and passenger. |
| Montes Line | 1 every 8 or 9 days | Progreso (Mexico) | Freight. |
| New York & Porto Rico Steamship Co. | 1 weekly | Porto Rican ports | Freight and passenger. |
| North German Lloyd Line [a] | 1 every 3 weeks | Bremen | Freight. |
| Norway-Mexico Gulf Line | 1 monthly | Christiania, Stavanger, Goteborg. | Do. |

[a] Service suspended during the war in Europe.
[b] Some of the boats carry passengers also.

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| Lines. | Sailings. | Ports of destination. | Service. |
|---|---|---|---|
| Pan-American Argentine Steamship Co. | 1 monthly | Montevideo, Buenos Aires, Rosario. | Freight. |
| Pierce-Cotoniera Line | do | Genoa, Naples | Do. |
| Pinillos Line | 1 every 2 weeks | Barcelona and other Spanish ports. | Freight and passenger. |
| Prince Line [a] | 1 monthly | Bremen | Freight. |
| Do.[b] | do | Havre, Rotterdam, Antwerp. | Do. |
| Royal Belgian Line | 1 every 2 weeks | Antwerp | Freight and passenger. |
| South Atlantic Steamship Line. | 1 monthly | London, Hull, Rotterdam | Freight. |
| Southern Pacific (Morgan Line). | 1 weekly | Havana | Freight and passenger. |
| United Fruit Co. Steamship Lines. | do | Ports in Honduras and Guatemala. | Do. |
| Do | do | Ports in Panama and Costa Rica. | Do. |
| Do | do | Ports in Panama | Do. |
| Do | do | Honduran ports | Do. |
| United Steamship Co. | 1 every 2 weeks | Santiago and Cienfuegos (Cuba). | Freight. |
| Do | 1 monthly | Manzanillo and Guantanamo (Cuba). | Do. |
| Do | do | Ports in Jamaica and Haiti. | Do. |
| Vogemann Line [c] | 1 every 2 weeks | Hamburg, Rotterdam | Do. |
| Do | 1 monthly | Antwerp, Bordeaux, Algiers. | Do. |
| Wolvin Line | 3 monthly | Vera Cruz and Tampico (Mexico). | Freight and passenger. |

[a] Service suspended during the war in Europe.
[b] Service to Antwerp suspended during the war in Europe.
[c] Service to Hamburg and Antwerp suspended during the war in Europe.

The following is a list of the principal steamship lines in the coastwise trade that call regularly at the port of New Orleans:

Gulf & Southern Steamship Co., which operates one freight and passenger boat weekly in each direction between New Orleans and Tampa.

Southern Pacific Co. (Morgan Line), which operates two freight and passenger boats and two boats that carry freight only, weekly in each direction, between New Orleans and New York.

No regular line of steamboats operating on the Mississippi River calls at New Orleans at present, but plans are being made for the establishment of a regular service between New Orleans and La Salle, Ill., and intermediate landings.

A fleet of coal barges is operated by the Alabama & New Orleans Transportation Co. from points in Alabama to New Orleans, via the inland waterways route.

**Commerce of the port.**—Data collected by the consulting engineers for the dock board [a] show that in the year ended June 30, 1914, the commerce [b] of the port of New Orleans amounted to 5,359,453 short tons, valued at $378,825,291. The following table shows the quantity and value of receipts and shipments in the foreign, the coastwise, and the local trade of the port in that year:

[a] Analysis of Present Operations of the Port of New Orleans with Present and Proposed Systems of Rates. Report made in 1915 by Ford, Bacon & Davis, engineers for Board of Port Commissioners, p. 53 of vol. 1, and p. 7 of vol. 2.
[b] Does not include "Mississippi River traffic, which does not make use of public wharves and is not required to pay fees or report to public authorities."

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| | Receipts. | | Shipments. | | Total. | |
|---|---|---|---|---|---|---|
| | Short tons. | Value. | Short tons. | Value. | Short tons. | Value. |
| Total | 2,402,863 | $122,909,168 | 2,956,590 | $255,916,123 | 5,359,453 | $378,825,291 |
| Foreign | 1,917,514 | 92,605,453 | 2,260,395 | 193,975,605 | 4,177,909 | 286,581,058 |
| Coastwise | 348,450 | [a] 23,301,331 | 607,320 | 54,247,498 | 955,770 | 77,548,829 |
| Local | 136,899 | [a] 7,002,384 | 88,875 | 7,693,020 | 225,774 | 14,695,404 |
| Steamboat | 109,182 | [a] 5,584,660 | 66,138 | 5,724,905 | 175,320 | 11,309,565 |
| Lugger | 27,717 | [a] 1,417,724 | 22,737 | 1,968,115 | 50,454 | 3,385,839 |

[a] Value estimated at $51.15 per short ton, which is the actual average value of the foreign commerce of the port. This average is, however, low as compared with that used at almost every other port in the United States.

The tonnage of cargoes that were received at or shipped from public, railroad, and private wharves and barges in the year ended June 30, 1914, classified by kind of vessel, is shown in the following table:

| Movement and class of terminals. | Ocean-going steamships. | | | | | | | | Steamboats. | Luggers, etc. | Grand total. |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | Class 1. | Class 2. | Class 3. | Class 4. | Class 5. | Class 6. | Class 7. | Total. | | | |
| Inward movement: | | | | | | | | | | | |
| Public wharves | Tons. 348,217 | Tons. 74,425 | Tons. 426,999 | Tons. 268,152 | Tons. 68,155 | Tons. 28,772 | Tons. 3,670 | Tons. 1,218,390 | Tons. 103,764 | Tons. 27,717 | Tons. 1,349,871 |
| Railroad wharves | 240,220 | 20,454 | ..... | 27,930 | 5,281 | 96,205 | 6,453 | 396,543 | ..... | ..... | 396,543 |
| Private wharves | 115,390 | 174,800 | 35,047 | 52,368 | 52,768 | 150,859 | 69,799 | 651,031 | 5,418 | ..... | 656,449 |
| Total | 703,827 | 269,679 | 462,046 | 348,450 | 126,204 | 275,836 | 79,922 | 2,265,964 | 109,182 | 27,717 | 2,402,863 |
| Outward movement: | | | | | | | | | | | |
| Public wharves | 682,830 | 134,210 | 239,852 | 526,679 | 69,192 | 33,565 | ..... | 1,686,328 | 66,138 | 22,737 | 1,775,203 |
| Railroad wharves | 768,063 | 174,956 | ..... | 80,368 | 16,497 | 43,044 | 6,132 | 1,089,060 | ..... | ..... | 1,089,060 |
| Private wharves | 4,202 | 840 | 17,708 | 85 | 5,777 | 21,276 | 5,880 | 55,768 | ..... | ..... | 55,768 |
| Barges | 29,909 | 4,692 | 90 | 188 | ..... | ..... | 1,680 | 36,559 | ..... | ..... | 36,559 |
| Total | 1,485,004 | 314,698 | 257,650 | 607,320 | 91,466 | 97,885 | 13,692 | 2,867,715 | 66,138 | 22,737 | 2,956,590 |
| Public wharves | 1,031,047 | 208,635 | 666,851 | 794,831 | 137,347 | 62,337 | 3,670 | 2,904,718 | 169,902 | 50,454 | 3,125,074 |
| Railroad terminals | 1,008,283 | 195,410 | ..... | 108,298 | 21,778 | 139,249 | 12,585 | 1,485,603 | ..... | ..... | 1,485,603 |
| Private terminals | 119,592 | 175,640 | 52,755 | 52,453 | 58,545 | 172,135 | 75,679 | 706,799 | 5,418 | ..... | 712,217 |
| Barges | 29,909 | 4,692 | 90 | 188 | ..... | ..... | 1,680 | 36,559 | ..... | ..... | 36,559 |
| Grand total | 2,188,831 | 584,377 | 719,696 | 955,770 | 217,670 | 373,721 | 93,614 | 5,133,679 | 175,320 | 50,454 | 5,359,453 |

It will be observed that in the foregoing table steamships have been divided into seven classes. Class 1 consists of general Atlantic lines of primary importance; class 2, general Atlantic lines of secondary importance; class 3, South American and Mexican lines; class 4, coastwise and insular possessions lines; class 5, smaller lines providing revenues in excess of $2,000 each; class 6, all other lines paying wharfage to board of commissioners; and class 7, all other lines paying harbor fee only.

*Exports and imports.*—The value of the foreign trade of the port for the year ended June 30, 1914, was $286,581,058, imports being valued at $92,605,453 and exports at $193,975,605.

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The quantity and value of the principal imports and exports, ranked according to value, are shown in the following tables:

| Commodities. | Quantity. | Value. |
|---|---|---|
| **IMPORTS.** | | |
| Coffee.....pounds.. | 308,008,145 | $33,499,299 |
| Raw sugar.....do.... | 701,381,802 | 16,232,623 |
| Sisal.....do.... | 224,201,600 | 10,797,370 |
| Burlap.....do.... | 106,808,013 | 7,125,372 |
| Bananas.....bunches.. | 16,583,625 | 4,896,739 |
| Crude mineral oil.....gallons.. | 90,811,051 | 1,333,803 |
| Nitrate of soda.....pounds.. | 99,646,400 | 1,308,714 |
| Mahogany logs.....1,000 feet b. m.. | 14,174 | 980,351 |
| Creosote oil.....gallons.. | 18,586,207 | 967,687 |
| Pig iron.....pounds.. | 38,129,280 | 715,750 |
| Molasses.....gallons.. | 21,163,046 | 634,387 |
| Rags for paper stock.....pounds.. | 42,096,873 | 511,366 |
| Jute bags.....do.... | 7,330,242 | 506,386 |
| Lemons.....do.... | 17,134,035 | 479,753 |
| Bagging.....square yards.. | 7,404,860 | 461,273 |
| Sugar-beet seed.....pounds.. | 4,867,496 | 426,755 |
| Glycerin.....do.... | 3,229,819 | 396,585 |
| Muriate of potash.....do.... | 8,224,869 | 362,922 |
| Toys..... | ..... | 304,458 |
| Kainit.....pounds.. | 125,937,280 | 292,014 |
| Olive oil, edible.....gallons.. | 189,559 | 271,112 |
| Pineapples..... | ..... | 227,104 |
| Rice, cleaned and uncleaned.....pounds.. | 7,121,336 | 221,200 |
| Magnesite.....do.... | 51,516,390 | 215,284 |
| Sulphate of ammonia.....do.... | 6,188,895 | 185,077 |
| All other..... | ..... | 9,251,069 |
| Total..... | ..... | 92,605,453 |
| **EXPORTS.** | | |
| Cotton.....bales.. | 1,710,503 | 105,957,675 |
| Oil.....pounds.. | 13,796,129 | 13,546,655 |
| Wheat.....bushels.. | 12,186,362 | 12,140,955 |
| Tobacco, leaf.....pounds.. | 86,771,379 | 11,947,955 |
| Lumber.....1,000 feet.. | 303,219 | 10,337,682 |
| Lard and lard compounds.....pounds.. | 51,511,638 | 5,714,340 |
| Flour.....barrels.. | 1,231,807 | 5,586,254 |
| Staves..... | 24,482,214 | 3,537,680 |
| Cottonseed meal and cake.....pounds.. | 241,158,436 | 2,957,436 |
| Linseed and flaxseed meal and cake.....do.... | 74,304,529 | 1,936,402 |
| Packing-house products, except lard and lard compounds.....do.... | 15,679,903 | 1,746,375 |
| Corn.....bushels.. | 1,717,652 | 1,336,800 |
| Boots and shoes.....pairs.. | 506,826 | 980,668 |
| Logs.....1,000 feet.. | 26,013 | 976,728 |
| Rosin.....barrels.. | 161,975 | 902,736 |
| Animals..... | 11,815 | 603,624 |
| Agricultural implements..... | ..... | 599,419 |
| Grease..... | ..... | 552,603 |
| Eggs.....dozen.. | 2,321,273 | 508,585 |
| Rice.....pounds.. | 10,864,632 | 452,227 |
| Paraffin wax.....do.... | 12,808,250 | 444,893 |
| Box shooks..... | 2,816,808 | 411,167 |
| Railroad ties..... | 561,574 | 393,636 |
| Turpentine.....gallons.. | 839,086 | 351,874 |
| Timber, pine.....1,000 feet.. | 16,458 | 338,425 |
| Pig iron.....tons.. | 21,843 | 314,255 |
| Sugar mill machinery..... | ..... | 270,549 |
| Cotton cloths.....yards.. | 2,724,450 | 248,725 |
| Butter and cheese.....pounds.. | 991,671 | 222,932 |
| Furniture..... | ..... | 211,365 |
| All other..... | ..... | 8,444,995 |
| Total..... | ..... | 193,975,605 |

*Coastwise and steamboat traffic.*—The data relating to coastwise trade cover tonnage only. In the year ended June 30, 1914, the total volume of coastwise shipping at the port of New Orleans was 955,770 short tons, receipts being 348,450 tons and shipments 607,320 tons.

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The following table contains a list of the principal commodities in the coastwise trade of the port in the year ended June 30, 1914:

| Commodities. | Quantity. | Commodities. | Quantity. |
|---|---|---|---|
| RECEIPTS. | | SHIPMENTS. | |
| Public wharves: | *Short tons.* | Public and railroad wharves: | *Short tons.* |
| Dry goods and cotton goods | 38,306 | Lumber and timber | 144,898 |
| Hardware | 26,198 | Rice | 80,260 |
| Sugar | 26,067 | Sugar and molasses | 74,339 |
| Cement, brick, and lime | 23,341 | Feed | 42,218 |
| Groceries | 14,730 | Oil | 32,984 |
| Paper | 14,528 | Rosin and turpentine | 30,264 |
| Pipe | 12,905 | Corn | 29,553 |
| Canned goods | 12,011 | Flour | 27,231 |
| Iron and steel manufactures | 11,962 | Cotton | 23,241 |
| Stone, sand, etc | 9,386 | Salt | 19,157 |
| Coal | 7,802 | Bullion | 12,834 |
| Machinery | 6,801 | Liquors, wines, beers, etc | 12,411 |
| Metal goods | 5,873 | Groceries | 9,094 |
| Soap | 5,700 | Lard, etc | 7,457 |
| Burlap and bagging | 5,389 | Fertilizer | 5,255 |
| All other | 47,131 | All other | 55,851 |
| Total | 268,152 | Total | 607,047 |
| Railroad and other private wharves | 80,298 | Private wharves and barges | 273 |
| Grand total | 348,450 | Grand total | 607,320 |

The traffic carried on steamboats, as this term is used in the special report, is purely local traffic that is carried between New Orleans and various points on the Mississippi River and the several lakes, bayous, and other waterways in the vicinity of the city. The tonnage carried by steamboats in the year ended June 30, 1914, was 175,320, all of which, with the exception of 5,418 tons (all sugar), was handled over the public wharves.

Steamboats delivered at the public wharves a large variety of articles, which were for the most part of local production. The principal commodities were as follows: Sugar, 21,600 tons; molasses, 17,036 tons; rice, 17,033 tons; cement, 6,630 tons; cotton seed, 5,664 tons; cotton, 5,596 tons; nails and wire, 5,010 tons; oysters, 4,765 tons; potatoes, 4,175 tons.

The commodities shipped by steamboats from the city were largely the products of the industries of the city and included the following principal commodities: Flour, 6,937 tons; sugar, 6,039 tons; rice, 3,615 tons; canned goods, 3,101 tons; lumber, 3,032 tons; ice, 1,982 tons; grits and meal, 1,981 tons; oats, 1,870 tons.

The traffic carried in luggers and similar craft was handled entirely at the public wharves. Of the 27,717 short tons delivered by these boats, 20,604 tons were oysters and practically all of the remainder consisted of farm produce. The outbound cargoes of the luggers amounted to 22,737 short tons and consisted largely of general merchandise.

**Extent and ownership of water front.**—The length of water front at the port of New Orleans is about 41.5 miles. The major portion of the frontage is owned by the State of Louisiana, and the privately-owned frontage is, under article 290 of the State constitution, subject to expropriation at the pleasure of the dock board. Among the principal owners of frontage privately held are the Illinois Central Railroad Co. with 4,765 feet, the New Orleans Terminal Co. with 4,900 feet of frontage, the Texas & Pacific Railway Co. with 2,600

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feet, and the Chalmette refinery of the American Sugar Refining Co., with approximately 1,800 feet.

Terminals.—All of the publicly-owned and many of the privately-owned terminals at the port of New Orleans are shown in the map opposite page 228. The following is a list of the wharves and wharf sheds operated by the dock board, together with their dimensions and area:

| Wharves. | Dimensions of wharves. | | | Dimensions of wharf sheds. | | |
|---|---|---|---|---|---|---|
| | Length. | Width. | Area. | Length. | Width. | Area. |
| | *Feet.* | *Feet.* | *Sq. ft.* | *Feet.* | *Feet.* | *Sq. ft.* |
| Valence Street | 2,363 | 102 | 214,026 | 900 | 50 | 45,000 |
| Harmony Street | 1,455 | 226<br>220<br>215 | 317,645 | 1,302 | 192 | 249,984 |
| Sixth Street | 1,655 | 134<br>212<br>128<br>208 | 297,065 | 600 | 190 | 113,800 |
| First Street | 2,000 | 211<br>184<br>197 | 394,320 | 1,786 | 191<br>147 | 296,795 |
| St. Andrew Street | 1,604 | 167<br>73 | 158,452 | 1,578 | 56<br>145 | 127,528 |
| Celeste Street | 1,200 | 185<br>63 | 219,316 | 1,168 | 164 | 191,552 |
| Robin Street | 3,176 | 219<br>92 | 529,174 | 2,634 | 100<br>209 | 450,800 |
| Erato Street | 994 | 286 | 284,584 | 988 | 200 | 197,600 |
| St. Joseph Street | 273 | 67 | 18,291 | 260 | 50 | 13,000 |
| Julia Street | 550 | 216<br>97 | 100,950 | 400 | 195 | 78,000 |
| Girod Street | 649 | 219<br>63 | 129,495 | 558 | 200 | 111,600 |
| Poydras Street | 988 | 281<br>102 | 226,076 | 700 | 200 | 140,000 |
| Bienville Street | 1,375 | 175 | 240,625 | 1,272 | 100 | 127,200 |
| Toulouse Street | 1,574 | 162<br>87 | 189,813 | 1,275 | 64<br>141 | 135,966 |
| Dumaine Street | 773 | 91 | 70,343 | 1,072 | 72 | 77,184 |
| Lugger Landing | 290 | 40 | 11,687 | | | |
| Governor Nicholls | 544 | 93 | 50,592 | 420 | 72 | 30,246 |
| Mandeville Street | 1,120 | 94 | 105,280 | 1,096 | 72 | 78,912 |
| Press Street | 960 | 93 | 89,280 | 806 | 52 | 41,912 |
| Louisa Street | 1,512 | 183<br>113 | 170,856 | 500 | 90 | 45,000 |
| Pauline Street | 1,160<br>360 | 140<br>260 | 238,720 | 572 | 155 | 88,704 |

The total length of improved wharf frontage is 26,575 feet, or 5.03 miles; and of wharf sheds, 19,887 feet, or 3.77 miles. The area of wharf space is 4,006,590 square feet and of wharf sheds 2,640,777 square feet.

The first warehouse to be built by the board of commissioners of the port is now (August, 1915) under construction and will be used for the compressing, storing, and handling of cotton. This warehouse with its various facilities will occupy a site of approximately 80 acres with 2,000 feet of wharf fronting on the Mississippi River. The warehouse and terminal, as designed, will consist of six 1-story warehouses, four for the use of consigned and f. o. b. cotton and two for the use of through cotton, in addition to a compress building, and two large receiving and sorting sheds.

The compress building and receiving shed will be 270 feet long and 410 feet wide. On each side of this building will be a warehouse for consigned cotton, each warehouse being 512 feet long and 203

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feet wide and divided into 32 compartments. South of these warehouses will be two sorting sheds, each 720 feet long and 130 feet wide; two additional warehouses for consigned cotton, each 672 feet long and 203 feet wide and each divided into 42 compartments; and two warehouses for through cotton, each 672 feet long and 102 feet wide and each divided into 21 compartments.

All of the warehouses and sheds will be constructed of reinforced concrete and steel and will be one story high. The height of the warehouses for consigned cotton will be 35 feet and of those for through cotton 45 feet.

The bulkhead of the wharf will be of reinforced concrete supported on untreated pine piles driven in clusters. In front of this bulkhead a creosoted pile-and-timber apron wharf 2,000 feet long and 44 feet wide has been constructed. This wharf will have a wharf shed 2,000 feet long and 122 feet wide on the first floor, and 100 feet wide on the second floor. This shed will also be of reinforced concrete and steel construction.

The Stuyvesant Docks property of the Illinois Central Railroad has two wharves and several warehouses. The larger wharf was constructed in 1905 and 1906 of reinforced concrete and steel. It is 3,500 feet long, varies in width from 131 feet to 153 feet, and has a net floor capacity of 497,000 square feet. The smaller wharf is of brick-and-frame construction and is 1,365 feet long and 152 feet wide, having a net floor capacity of 192,280 square feet.

Three brick warehouses have the following dimensions:

| Warehouse numbers. | Length. | Width. | Floor capacity. |
|---|---|---|---|
| | *Feet.* | *Feet.* | *Sq. feet.* |
| No. 30 | 1,200 | 101 | 118,602 |
| No. 31 | 1,041 | 101 | 102,861 |
| No. 32 | 2,290 | 185 | 418,704 |

These docks have two grain elevators which were built in 1906 and are of brick and frame construction. Elevator E is 330 feet long and 90 feet wide and has a capacity of 1,500,000 bushels, while elevator D is 286 feet long and 84 feet wide and has a capacity of 1,000,000 bushels. Belt conveyors extend from these elevators to the ship which is loading. The power houses for these elevators are 113 feet long with a width of 40 feet for elevator E and 48 feet for elevator D. Each has a drip shed of steel framework and metal covering 200 feet long and 35 feet wide.

Between Thalia and Calliope Streets the Illinois Central Railroad Co. has a number of freight sheds, a cotton shed, an icehouse, and stock pens.

The Westwego terminals of the Texas & Pacific Railway are located at Algiers on the opposite side of the city proper. These terminals cover an area of about 200 acres and have wharf frontage of approximately 2,600 feet. The wharves have an area of 503,000 square feet and the wharf sheds an area of about 284,000 square feet. These terminals have two grain elevators with a combined storage capacity of 1,350,000 bushels.

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The terminals of the New Orleans Terminal Co., which are used by the New Orleans Great Northern, the New Orleans, Texas & Mexico, and the Queen & Crescent Railroads, are located at Port Chalmette, 6 miles below the city of New Orleans. This company owns a tract of about 5,500 acres with 2½ miles of river frontage. The terminals consist of a wharf and a pier with about 2,000 feet of berthing space fronting on the river, and wharves fronting on a slip with about 2,900 feet of berthing space. The wharf and pier on the river front cover an area of 471,510 square feet and have a shed with an area of 276,000 square feet. The floor area of the wharf sheds along the slip is about 635,600 square feet.

*Steamship terminals.*—Morgan's Louisiana & Texas Railroad & Steamship Co., a subsidiary of the Southern Pacific Co., occupies three terminals at this port, one being at New Orleans proper, another at Algiers, and the third at Gretna. The New Orleans terminal has a frontage of approximately 675 feet which is leased from the Board of Port Commissioners of New Orleans. This terminal is used chiefly for the transfer of cars between rails and car floats. A small wharf adjoins the passenger shed; but it is an open wharf and is used only occasionally by a floating derrick for transferring heavy freight cars.

The Algiers terminal of this company occupies a frontage of about 3,500 feet. Approximately 1,500 feet of this frontage is used for ferry slips and is improved by a passenger shed and by a new freight shed, which is 800 feet long and 135 feet wide at one end and 180 feet wide at the other. Adjoining this frontage is a wharf 375 feet long, which is now used only for mooring floating equipment undergoing repairs. The terminal at Algiers includes about 550 feet of covered wharf, which is in poor condition and is used only for landing cattle and for discharging oil.

The Gretna terminals occupy a river frontage of 874 feet, all of which is improved by wharves. In the rear of the wharf is a one-story freight shed 645 feet long and 61 feet wide.

The wharves occupied by the steamships of the Southern Pacific Co. are equipped with 15 endless-belt conveyors or moving platforms. These conveyors are about 70 feet long and are electrically operated at a maximum speed of 225 feet per minute. The ships of this company are provided with side ports. This gives the conveyors a greater efficiency and makes the use of the ship's tackle and slings unnecessary. The cargo is, as a rule, loaded on trucks which are carried out of the hold of the ship on the conveyor.

One of the most efficient terminals at this port is that of the American Sugar Refining Co. plant at Chalmette, which has been described in the following terms: [a]

> This company (the American Sugar Refining Co.) operates a wharf 850 feet long in connection with its Chalmette refinery, at which two vessels can discharge simultaneously at all four hatches and a third at two hatches.
>
> The wharf is connected with the warehouses on shore by approaches and also by an overhead trolley conveyor known as the telpherage system, operated for the exclusive use of the company. There are 25 cars in this system driven by direct current, each car being operated by one man and carrying each trip 1 ton of sugar from the wharf to storage sheds, a distance varying from 2,000 to 3,000 feet for the round trip. Each car will convey about 15 tons per hour over this distance, 1 ton at each trip.

[a] Special Report of Chief of Engineers, U. S. Army, on Water Terminal and Transfer Facilities (H. Doc. No. 226, 63d Cong., 1st sess.), pp. 1494-1495.

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On account of the considerable distance from the wharf to the storage shed, the saving of time by this method over that of any manual-labor method of doing this work is incalculable. The appliances are used not only for transporting the sugars for a distance of 1,000 to 1,500 feet, but are also used for tiering up or piling the sugar to any desired height in the shed, and this feature is one of the main advantages of the appliances.

This company does not use mechanical appliances in discharging vessels to wharf or loading vessels from wharf, but this work is done by the regular stevedores, as is the case with other wharves in the port.

It might be said that the telpherage system used at the Chalmette refinery is without question the most efficient of its kind in the United States. Its success is due chiefly to the fact that it handles very large quantities of a uniform size over a considerable distance.

In the matter of special cargo-handling appliances, attention might be called also to the banana conveyors that are used at the wharves occupied by the United Fruit Co. and the Cuneo Importing Co.

**Type of wharf construction.**—The prevailing type of construction is that of wharves parallel to the shore and built of creosoted pile and timber.

**Port administration.**—Three distinct administrative bodies exercise control over the port of New Orleans. Two of these are State boards and the third is a municipal board or commission. Each body has a distinct field of operation, but all work in harmony.

The State boards are the Board of Commissioners of the Orleans Levee District and the Board of Commissioners of the Port of New Orleans. The municipal body is the Public Belt Railroad Commission.

The members of the Board of Commissioners of the Orleans Levee District, or the Levee Board, as it is generally called, are appointed by the governor and serve without pay. The chief purpose of the Levee Board is to build levees to protect the city against floods and inundations. The board has the power to acquire land by purchase or condemnation and to build levees wherever the same appear to the members of the board to be required.

The amount of river-front property acquired by the Levee Board has been sufficient to provide the Dock Board with space for wharves and wharf sheds and, in many instances, also a right of way for the Public Belt Railroad.

The Board of Commissioners of the Port of New Orleans, or the Dock Board as it is generally called, was created by act of the State legislature in 1896. It is interesting to note the language used in the preamble of this act, which is as follows:

Whereas the port of New Orleans has been gradually extended until it has reached beyond the limits and jurisdiction of the city of New Orleans; and

Whereas the divided authority of three parishes and the multiplicity of officials with their various fees and the development of contiguous rival ports will act injuriously and prejudicially to the traffic of the port; and

Whereas the tax on shipping exacted for various fees, charges, etc., is of such proportions as to threaten to divert the trade to less expensive ports; and

Whereas the supervision and control of an intelligent board of State commissioners can consolidate the services of harbor masters and wardens, wharf superintendents, and wharfingers of three parishes into one set of competent employees at a reduced expense, can operate and improve the wharves and other terminal facilities of the port and greatly develop and expand its commerce by removing many of the obstacles now placed in the way of its advancement.

The act of 1896 provided for a board of five members, all of whom must reside within the parishes included in the port of New Orleans

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and must be "prominently identified with the commerce or business interests" of the port. The commissioners are appointed for terms of five years, one commissioner retiring annually. They serve without compensation.

The commissioners elect, out of their own number, a president, vice-president, and secretary. They are required to meet in regular session twice a month from September to April, inclusive, and once a month from May to August, inclusive, with special sessions as often as they may be called by the president or on the written request of three members.

Section 2 of the act of July 9, 1896, as amended by the act of July 3, 1900, gives the Dock Board the fullest possible control over the port in providing that the board shall have the following powers:

(1) To regulate the commerce and traffic of the port and harbor of New Orleans in such manner as may, in their judgment, be best for its maintenance and development.
(2) To enjoy all the rights, powers, and immunities incident to corporations.
(3) To take charge of and administer the public wharves and lands of the port of New Orleans.
(4) To construct new wharves where necessary and to erect sheds on the wharves and landings to protect merchandise in transit.
(5) To maintain sufficient depth of water.
(6) To collect dockage charges and harbor fees at specified rates (see list of charges at p. 241) and such charges for the use of wharf sheds as will not exceed cost.
(7) To acquire by purchase or by appropriation any property, wharves, or landings necessary for the benefit of the commerce of the port; the common council of the city of New Orleans to provide for the payment out of funds under its control, provided the price to be paid is satisfactory to the said council.

In 1910 (act No. 133) the Dock Board was given power "to erect and operate warehouses and other structures necessary to the commerce of the port of New Orleans," with the right of eminent domain in connection therewith, with authority to issue bonds therefor payable out of net revenues, and with power to fix charges and to issue warehouse receipts, either negotiable or nonnegotiable.

The first Dock Board assumed its duties on September 5, 1896, but control of the wharf system was not assumed until May 29, 1901, when the lease of the Louisiana Construction & Improvement Co. expired.

The funds of the Dock Board for construction and operation are provided entirely by revenues from wharfage and shed charges, harbor fees, etc. The organic act does not give the board the power to raise funds by taxation nor to issue bonds without the consent of the legislature and unless the interest on the same as well as the principal can be paid out of revenues.

It is interesting to note that the Dock Board provided out of its revenues for the rebuilding of practically the entire wharf system which it took over on May 29, 1901, from the Louisiana Construction Improvement Co., in addition to the cost of new wharves, new steel sheds, paved roadways, and dredging, as well as the costs of maintenance and operation.

The Public Belt Railroad Commission is a municipal body consisting of 17 members, part of whom are appointed by the mayor acting on his own initiative and part upon the nomination of the various commercial organizations. They serve without compensation. The chief administrative officer of the commission is a secretary-treasurer, who devotes his entire time to the work.

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**Port charges.**—*Pilotage.*—The charge for pilotage over the bar, inward or outward, is $3.50 per foot draft for vessels drawing 10 feet or less and $4 per foot draft for vessels drawing more than 10 feet. The charge for pilotage in the river from the bar to the city or in the opposite direction is $1.75 per foot draft.

*Towage.*—The charge for assisting a vessel to dock or from dock is $15 for each tug, while the average charge for shifting from one berth to another is $30 per shift, if one tug is used, with an additional charge of 50 per cent for a second tug. The following is a list of charges made for shifting vessels in one direction only between specified locations:

| From berth at— | To berth at— | Charge per shift. |
|---|---|---|
| Harbor | Chalmette | $40.00 |
| | Westwego | 40.00 |
| | Stuyvesant Docks | 30.00 |
| | Gretna | 30.00 |
| Westwego | Chalmette | 75.00 |
| | Stuyvesant Docks | 35.00 |
| Gretna | Chalmette | 40.00 |
| | Westwego | 40.00 |
| | Stuyvesant Docks | 30.00 |
| Anchorage at Point | Chalmette | 35.00 |
| | Westwego | 50.00 |
| | Stuyvesant Docks | 35.00 |

*Harbor dues.*—Vessels of less than 100 gross register tons pay a harbor fee of $2.50, while vessels of from 100 to 499 gross register tons pay $5. Vessels of more than 500 gross tons pay $10 if they arrive in ballast or with cargo of green fruit only and $15 if they carry general cargo. In lieu of harbor dues, towboats operating regularly in the harbor pay an annual license fee of $60; small craft of 15 tons or less, a $12 fee; and flatboats, barges, and other similar craft, not including steamboats, fees ranging from $18 per annum for boats of less than 25 tons to $120 for those of more than 100 tons.

*Dockage.*—The present charges for berths at the wharves controlled by the Board of Commissioners of the Port can best be described in the following extract from the special report on port charges recently made by the engineers for the board:

On all seagoing vessels a charge of 2 cents per day per gross register ton of vessel is made for each of the first three days it occupies a berth at the public wharves and 1 cent per day per gross register ton for each of the three succeeding days, a total of 9 cents per gross register ton, which is paid during the first six days at the public wharves. After this charge is made there is a time allowance of 30 days for which no dockage charge is made. At the expiration of this 36 days from date of first dockage, the above rates are again applied.

For accumulating outward cargo, a free time of 10 days is allowed prior to the vessel's arrival or dockage at berth, but on the beginning of the eleventh day of such wharf use by cargo, the above dockage charge begins to apply against the ship the same as if it were actually moored to the wharf.

In the above dockage charges any part of a day constitutes a full day; however, the charge for a subsequent day is not begun until 24 hours after the vessel docks.

The above charges apply to each continuous stay in port by the vessel.

The wharfage or dockage dues on all steamboats is 6 cents per gross register ton for a total period of not over five days, after which a charge of $3 per day is made. However, this latter charge shall not exceed one-fifth of the first charge of 6 cents per ton. If it does, the second charge shall be 1½ cents per gross ton per day.

Steamboats arriving and departing more than once a week are charged 3 cents per gross ton on each trip.



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Steamboats lying up during the summer months are charged 60 cents per day.
In the case of small craft (luggers, etc.) of 25 gross tons or less, the above dockage charge is $1.20 per trip.

No dockage charge is made at any of the private or railroad wharves.

*Wharfage.*—Strictly speaking, no charge is made against cargoes for the use of any of the wharves at this port, nor is any charge made at present (August, 1915) against transportation companies or shipping agents for the preferential assignment of any publicly-owned shed or wharf for the collection and shipment of cargo. However, a charge of 1½ cents per gross register ton is made against vessels for the use of wharf sheds for a period of 36 days or less.

*Switching charges.*—The following is a list of switching charges [a] made by the Public Belt Railroad, which serves all of the public wharves:

Switching charges on all carload freight (except explosives) between switches, tracks, industries, and warehouses on the Public Belt Railroad and between all connections, $2 per car, initial movement; return movement, gratis.
For replacing, reconsigning, or changing location of cars, caused by error of consignee or any other cause not chargeable to the New Orleans Public Belt Railroad, an additional switching rate of $2 per car will be charged.
On carload competitive traffic received or forwarded via the New Orleans Public Belt Railroad for or from industries, switches, and warehouses located on the tracks of the New Orleans Public Belt Railroad, the switching charges of New Orleans Public Belt Railroad are absorbed by connecting lines.
Cars that are received from connecting lines for industries or that are received from industries for connecting lines will, if refused, be returned at the expense of the road or industry from which they are received.
All cars are subject to demurrage charges under the demurrage tariff of the New Orleans Public Belt Railroad.
A charge of $3 per car as rental will be made for the use of cars furnished by the New Orleans Public Belt Railroad for loading to points within the switching limits of New Orleans, except where private cars are used.
Cars will be inspected to ascertain their availability for use under the rules, cleaned, and prepared for loading upon request of shippers. An expense charge of $1 will be paid by the receiving line for each car furnished.

*Stevedoring.*—The standard rate of wages for stevedore laborers at New Orleans, according to a special report prepared by the engineers for the dock board, is 40 cents per hour for a period not exceeding 10 hours, 60 cents per hour for each additional hour or for night work, and 80 cents an hour for work on Sundays or holidays. The prevailing charge for unloading general cargo is 45 cents per long ton; for kainit in bulk, 50 cents per long ton; and for sisal, 6 cents per bale.

*Proposed system of charges.*—Under the present system of port charges the entire burden falls upon the vessel in the form of dockage and shed charges. It is now proposed, as the result of the investigations made by the engineers for the dock board, to institute a new system which will apportion the charges so that they shall fall in part on the ship (dockage), the shipping agent (shed rent), and the consignor or consignee (wharfage or tolls).

The engineers recommend that the dockage charges per 1,000 ship-ton hours be as follows: Assigned wharf, 18 cents; unassigned wharf (including use of wharf), 28 cents; nonactive wharf (idle vessels), 10 cents. The proposed dockage charge is based on the gross register tonnage of a vessel multiplied by the number of hours it

[a] Pamphlet on "General Information," issued May 1, 1914, by the Public Belt Railroad Commission, city of New Orleans.

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remains at the wharf. The rates shown above were derived from a careful study of the tonnage handled by a number of vessels and are based upon the assumption that a fair rate of cargo handling is "3¾ short tons of cargo per hour of a 24-hour day per 1,000 gross tons of ship."

The engineers state that "the time element which to-day is effective only to a partial extent must be fully operative in the proper application of an equable system of charges. The charging of dockage to the ships on an absolute time-and-size basis should adjust inequalities now existing and tend to prevent a congested condition with the result that vessels should not occupy the wharves longer than absolutely essential to their operation."

The proposed charge against the steamship agent for the preferential assignment of wharf space is fixed at 3 mills per square foot per month for uncovered wharves and 3.5 mills for wharves with sheds, the assignment to be from month to month only and not to be absolute or exclusive.

The proposed wharfage or toll charges made against the commodities comprising the inward and outward cargoes of vessels at public wharves are to be based upon cubic feet of stowage space occupied by the commodities and not upon the weight of the same. The rates as proposed for the important commodities are approximately 10 cents for 40 cubic feet, or ¼ cent per cubic foot of space. The rates, though based on space, may be expressed in terms of "cents per 100 pounds." Commodities which are of minor importance and move in small volume will be charged at the rate of 1½ cents per 100 pounds. No wharfage charge is to be made against cargoes in the local lake or river trade nor on commodities loaded from barges or lighters directly into vessels or vice versa.

The following is a list of the proposed wharfage charges on a number of principal commodities worked out at rates per 100 pounds:

| Commodities. | Charges. | Commodities. | Charges. |
|---|---|---|---|
| Agricultural implements | $0.02 | Iron and steel | $0.0025 |
| Ammunition | .015 | Kainit | .005 |
| Bags and bagging | .0075 | Lards, etc. | .01 |
| Bananas and plantains | [a].005 | Lemons | .01 |
| Brick | .005 | Linseed cake and meal | .0075 |
| Bullion | .015 | Logs | .01 |
| Canned goods | .01 | Lumber and timber | [c].25 |
| Cement | .0075 | Machinery | .015 |
| Chemicals, drugs, dyes, etc. | .015 | Marble | .0025 |
| Coal | .005 | Molasses | .005 |
| Coffee | .01 | Oil: | |
| Coke | .01 | Edible | .01 |
| Corn | .0075 | Refined | .0075 |
| Cotton | .0125 | Packing-house products | .01 |
| Cottonseed meal and cake | .0075 | Paper manufactures | .0075 |
| Crockery and earthenware | .02 | Piling | .0075 |
| Cross ties | [b].005 | Pyrites | .005 |
| Dry goods | .015 | Rags | .0075 |
| Feed | .01 | Rice | .0075 |
| Ferromanganese | .005 | Rosin | .0075 |
| Fertilizer | .005 | Salt | .005 |
| Flour | .01 | Seed | .01 |
| Fuller's earth | .005 | Shooks, staves, and headings | .01 |
| Furniture | .02 | Soap | .01 |
| Glassware | .02 | Stone and sand | .005 |
| Grease | .01 | Tinware and enameled ware | .015 |
| Groceries | .01 | Tobacco | .0125 |
| Hardware | .01 | Turpentine | .0075 |
| Hay | .01 | Wines, liquors, and beer | .015 |
| Household goods | .015 | All other | .015 |

[a] Per bunch. [b] Per tie. [c] Per 1,000 feet b. m.

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On July 19, 1915, the Board of Commissioners of the Port of New Orleans adopted a resolution putting into effect on August 1 the various rates recommended by the engineers. Upon request of steamship agents, railroad officials, and others for a postponement and also in order to permit hearings upon the proposed rates, the board decided to postpone the date for going into effect until September 15, 1915.

## PENSACOLA, FLA.

Pensacola enjoys generally the reputation of having the best and the only natural deep-water harbor on the Gulf of Mexico. The city is located on Pensacola Bay, about 8 miles from the open sea and about 40 miles east, by water, of Mobile.

The total water surface of Pensacola Bay, together with that of the adjoining Escambia, East, and Black Water Bays and the western part of Santa Rosa Sound, is approximately 150 square miles. Into Escambia Bay, an arm of Pensacola Bay, flows the Escambia (Conecut) River, which drains a heavily-timbered country in southern Alabama and western Florida.

A large portion of Pensacola Bay has a depth of more than 30 feet at mean low water, which provides a large area for anchorage, while the entrance channel had on June 30, 1914, a minimum depth of 31 feet and a minimum width of 500 feet.[a] The tides are reported as "irregular, being, to a great degree, influenced by the force and direction of the wind."[b]

**Railroads.**—The only important railroad serving the port of Pensacola is the Louisville & Nashville. Two other railroads have terminals at this port, the Gulf, Florida & Alabama Railroad and the Pensacola, Alabama & Tennessee Railroad. The former extends at present (August, 1915) only from Pensacola to Broughton, Ala., a distance of 90 miles, but when completed, will connect with the Southern Railway, the Mobile & Ohio, the Alabama Great Southern, the St. Louis & San Francisco, and the Illinois Central Railroads.

The Pensacola Electric Co. operates a street railway on Main Street which serves all of the wharves except the Palafox Street Wharf. In fact, this part of its right of way is used as a marginal railroad and the company performs switching service from dock to dock, a special electric locomotive being used for this purpose. A flat switching charge of $2 per car covers the movement of the car both ways.

**Steamship lines.**—Two lines of small steamers, engaged in coastwise trade, call regularly at this port, namely, the Boca Grande Steamship Co. and the Pensacola, St. Andrews & Gulf Steamship Co. The latter operates between Pensacola and Mobile on the west, and between Pensacola and Apalachicola and Carabelle on the east. The former operates between Pensacola, Tampa, and New Orleans.

The following is a list, compiled from the Exporters' Encyclopedia for 1915, of the principal lines of steamships engaged in foreign trade that call regularly at Pensacola:

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[a] Report, Chief of Engineers, U. S. Army, 1914, pp. 663–664.
[b] Coast Pilot, Atlantic Coast, Part VIII, p. 76.

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| Lines. | Sailings.[a] | Ports of call. |
|---|---|---|
| Austro-Americana Line [b] | 1 monthly | Barcelona, Venice, Trieste, Fiume. |
| Franco-American Line | do | Havre, London. |
| Manchester Line | do | Manchester. |
| Serra Line | 1 or 2 monthly. | Liverpool. |
| Teutonic Line [b] | 1 monthly | Bremen, Amsterdam. |

[a] Approximate only.
[b] Service suspended during the war in Europe.

**Commerce of the port.**—The principal part of the commerce at Pensacola is foreign, as is shown by the following summary of the commerce handled during the calendar years 1913 and 1914:[a]

| Class. | Short tons. | | Value. | |
|---|---|---|---|---|
| | 1913 | 1914 | 1913 | 1914 |
| Foreign: | | | | |
| Imports | 102,147 | 107,323 | $1,606,190 | $1,766,883 |
| Exports | 946,783 | 735,596 | 23,854,469 | 12,708,369 |
| Total | 1,048,930 | 842,919 | 25,460,659 | 14,475,252 |
| Coastwise: | | | | |
| Inbound | 350,856 | 269,661 | 5,860,128 | 4,916,310 |
| Outbound | 75,264 | 51,922 | 5,252,647 | 3,427,557 |
| Total | 426,120 | 321,583 | 11,112,775 | 8,343,867 |
| Grand total | 1,475,050 | 1,164,502 | 36,573,434 | 22,819,119 |

The principal exports are cotton, lumber, naval stores, and tobacco. The principal commodities in the foreign commerce of the port are shown in the following table:[a]

| Commodities. | Short tons. | | Value. | |
|---|---|---|---|---|
| | 1913 | 1914 | 1913 | 1914 |
| EXPORTS. | | | | |
| Cotton | 37,824 | 15,568 | $10,046,918 | $3,827,274 |
| Lumber and timber products: | | | | |
| Lumber | 578,283 | 415,423 | 5,803,427 | 4,196,310 |
| Logs | 4,937 | 9,089 | 98,726 | 208,259 |
| Staves, etc | 12,011 | 5,427 | 231,815 | 71,399 |
| Total | 595,231 | 429,939 | 6,133,968 | 4,475,968 |
| Naval stores: | | | | |
| Resin | 121,072 | 60,709 | 3,389,009 | 1,145,384 |
| Turpentine | 14,025 | 5,986 | 1,484,977 | 657,920 |
| Pitch | 19,882 | 50,389 | 236,196 | 381,667 |
| Pine tar | 958 | 909 | 22,986 | 21,186 |
| Total | 155,937 | 117,993 | 5,133,168 | 2,206,157 |
| Tobacco | 4,498 | 4,206 | 1,030,969 | 761,203 |
| All other | 153,293 | 167,890 | 1,509,446 | 1,437,767 |
| Total exports | 946,783 | 735,596 | 23,854,469 | 12,708,369 |

[a] Report, Chief of Engineers, U. S. Army, 1914, pp. 2163–2164; idem, 1915, p. 2509.

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| Commodities. | Short tons. | | Value. | |
|---|---|---|---|---|
| | 1913 | 1914 | 1913 | 1914 |
| IMPORTS. | | | | |
| Nitrate of soda | 11,109 | 13,070 | $540,961 | $635,362 |
| Mahogany logs | 24,336 | 28,059 | 515,112 | 565,243 |
| Potash | 5,909 | 5,441 | 168,735 | 163,334 |
| Manure salts | 10,244 | 8,236 | 79,041 | 60,871 |
| Sulphur ore | 17,232 | 5,700 | 57,038 | 19,418 |
| Copper ore | 3,200 | ..... | 56,160 | ..... |
| Kainit | 8,601 | 14,399 | 42,869 | 64,611 |
| Manganese ore | 5,240 | 21,050 | 39,301 | 157,875 |
| All other | 16,276 | 11,368 | 106,973 | 100,169 |
| Total imports | 102,147 | 107,323 | 1,606,190 | 1,766,883 |

In the coastwise trade at this port in 1913, which was the more nearly normal trade year, and is, therefore, preferable for purposes of discussion, miscellaneous merchandise constituted nearly four-fifths of the shipments ($4,056,240 out of a total of $5,252,647); while lumber and timber products constituted more than one-half of the receipts ($3,011,313 out of a total of $5,860,128), and naval stores, more than one-fourth. Fish is an important inbound commodity in the coastwise trade at Pensacola.

The character of the commerce of the port is further indicated in the following statement, which shows the number, nationality, and net register tonnage of vessels that entered Pensacola in the calendar year 1913:[a]

| Class of vessels. | Number of vessels. | | | Net register tonnage. |
|---|---|---|---|---|
| | American. | Foreign. | Total. | |
| Steam | ..... | 303 | 303 | 723,141 |
| Sailing | 39 | 91 | 130 | 81,768 |
| Total | 39 | 394 | 433 | 804,909 |

In addition to the above the following vessels are regularly engaged in the business of the port:[a]

| Class. | Vessels. | | Number of passengers. |
|---|---|---|---|
| | Number. | Tonnage. | |
| Registered: | | | |
| Steamers | 12 | 67,352 | 20,772 |
| Tugs | 16 | 639 | ..... |
| Schooners | 2 | 3,526 | ..... |
| Gasoline launches | 4 | 16,024 | 8,571 |
| Fishing smacks | 55 | 28,344 | ..... |
| Unregistered: | | | |
| Barges | 35 | 3,526 | ..... |
| Rafts | 776 | ..... | ..... |

[a] Report, Chief of Engineers, U. S. Army, 1914, p. 2165.

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**Extent and ownership of water front.**—Within the limits of the city of Pensacola there is approximately 15,600 feet of lineal water front, of which the city owns about 8,200 feet, the railroads about 7,050, and private interests about 350 feet.

**Terminals.**—The principal terminals at Pensacola belong to the Louisville & Nashville Railroad and comprise three large piers and one small pier, as follows:

The Muscogee Dock, which is 2,440 feet long and 120 feet wide at the outer end and 46 feet in width at the shore. This pier is a trestle with 13 chutes for coal and 4 for grain, and has two tracks, one being used for the return of empty cars. Vessels may be loaded with phosphate rock or bunker or cargo coal from this upper level while receiving other cargo, such as naval stores or lumber, on the lower, or dock level.

The Tarragona Street Wharf, which is 1,950 feet long and from 130 to 140 feet wide. In the rear of this pier is a grain elevator, which has a capacity of 500,000 bushels, but which has not been used for a number of years. On the wharf itself are two warehouses, both of frame construction. One warehouse is 50 feet in width and 404 feet in length and is divided into 11 compartments for the storage of bulk freight, such as salt, potash, cottonseed cake, etc. These products are stored or removed by means of an automatic railway (C. W. Hunt type). The other warehouse is of about the same size and on one side has tracks on two different levels, the arrangement being such it is claimed, that these tracks can be used simultaneously and expeditiously for transferring freight from cars to vessels, from vessels to cars, or to or from the warehouse.

The Commandancia Street Wharf, which is 2,065 feet long and 108 feet wide and has a two-story frame warehouse, 1,200 feet long and 105 feet wide. Five tracks run alongside of this warehouse, three on the lower and two on the upper level.

The Jefferson Street Wharf, which is 160 feet long and 80 feet wide. This pier has no shed or warehouse, since lumber and naval stores only are handled there. In the slip adjoining this wharf is a timber boom.

The other railroad terminals at Pensacola, those of the Gulf, Florida & Alabama Railroad and the Pensacola, Alabama & Tennessee Railroad, are comparatively new; in fact, one of the piers of the former road is only partially completed. The four piers of these two companies are used exclusively for lumber and are, therefore, open structures. All of these docks are long and have deep water alongside. At both piers of the Gulf, Florida & Alabama Railroad the depth of water is 31 feet and at those of the Pensacola, Alabama & Tennessee Railroad, 28 feet.

The piers of the Gulf, Florida & Alabama Railroad promise to become active terminals when the railroad is extended and connected with several of the large southern railroads. At the present time the traffic of this road consists almost entirely of lumber and timber products.

The Palafox Street Wharf is used very largely as a fish wharf. It is owned by E. E. Saunders and Co. and is used by them as a fish depot and as a landing place for a large fleet of fishing boats. Space on the east side of this dock is used by excursion boats, tugs, and

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other small boats. The depth of water alongside of this dock ranges from 10 to 20 feet.

The Baylen Street Wharf is used exclusively by the Warren Fish Co. as a dock for a large fleet of boats.

The city of Pensacola owns considerable water frontage, but none of it is improved with docks or wharves. A bond issue of $450,000 for the construction of municipal terminals and a belt railroad, has, however, been approved by the voters of the city, but no definite plans for the work have as yet been made.

**Type of wharf construction.**—The prevailing type of construction is that of long, open piers built of pile and timber.

**Port administration.**—The administration of the port, so far as it is now exercised, is largely in the hands of a board of pilot commissioners and a harbor master. The General Statutes of the State of Florida provide for the appointment by the governor of a board of pilot commissioners for each port in the State, said board to consist of five members who are residents of the port and are not "in any manner interested in the business of pilotage or the employment of pilots." They serve for four years.

The board examines, licenses, and regulates all pilots,[a] may fix rates of pilotage,[b] and may "make and promulgate, in conformity with law, rules and regulations for the government and protection of the port."[c] The commissioners are empowered also to act as port wardens and are, therefore, required when so requested, to examine "the condition and storage of cargo" and to report on the same.[d]

The harbor master also is appointed by the governor. His term is two years. He is ex officio a member of the board of port wardens and pilot commissioners of his port district.[e] The harbor master has the usual duties of that office, namely, to assign berths at the wharves, to have obstructing vessels removed, and "to determine how far and in what instance it is the duty of masters and others having charge of vessels to accommodate each other in their respective situations."[f] The compensation of the harbor master is derived from fees, the law permitting him to charge not more than $20 per vessel.[g]

The water front owned by the city is under the control of the city commissioners. The charter of the city[h] provides for the commission form of city government and gives the board of commissioners power by ordinance:

1. To construct, own, equip, and operate such wharves, docks, railroads, and terminals as may be deemed advisable for the promotion of the trade and commerce of the port.
2. To improve and regulate the use of the harbor within the limits of the city.

**Port charges.**—*Pilotage.*—The rates of pilotage per foot of draft as fixed by State law[i] are as follows: 6 feet or less draft, $2; 6 to 10 feet, $3; 10 to 14 feet, $4; 14 to 20 feet, $5; 20 feet and over, $6. Pilotage charges outward and inward are the same.

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[a] General Statutes, sec. 1293, amended by chap. 6206, acts of 1911.
[b] Idem, sec. 1300.
[c] Idem, sec. 1301.
[d] Idem, sec. 1307.
[e] Idem, sec. 1322.
[f] Idem, sec. 1325.
[g] Idem, sec. 1326.
[h] Charter of the city granted May 3, 1913, sec. 26.
[i] General Statutes, sec. 1300.

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Steamers calling for bunker coal only pay a flat rate of $2.25 per foot of draft inward and the same outward. Vessels carrying United States mail pay half rates. Pilotage is optional with vessels drawing 6 feet of water or less if they have a coastwise license.

*Towage.*—The towing charges from "sea to sea" are 25 cents per register ton for foreign sailing vessels and 15 cents per register ton for American sailing vessels.

*Harbor dues.*—The harbor master charges approximately 1 cent per ton register for all vessels except those calling for bunkerage only, which pay one-half per cent per register ton per day, or fraction thereof, Sundays and holidays excepted. In no case may his fee exceed $20 per vessel.

*Dockage.*—The tariffs of the Louisville & Nashville Railroad contain the following regulations concerning the use of the terminals of that company:

1. The use of the wharves and the warehouses, elevators, coal chutes, log booms, and other facilities on the wharves is limited to traffic via the Louisville & Nashville Railroad handled by vessels operating between Pensacola, Fla., and ports in foreign countries, including the United States insular possessions; the Canal Zone of Panama, points in the States of California, Oregon, and Washington, and the Territory of Alaska, on the Pacific coast; points in the State of Texas and the State of Louisiana, west of the Mississippi River on the coast of the Gulf of Mexico; and points on the west coast of Florida, and on the east coast of the United States, except as herein provided.
2. Vessels desiring berths will make application to the agent. No vessel will be allowed to occupy a berth at any of the wharves until so assigned, or to move from one berth to another, except as directed by the agent or wharfmaster. Vessels will be assigned to suitable berths without discrimination in the order of application.
3. Vessels will be subject to wharfage charges as follows: Sailing vessels, three-tenths of 1 per cent per register ton per day or fraction thereof; minimum charge, $3 per day or fraction thereof; steamers, one-half of 1 cent per register ton per day or fraction thereof. In making computation, Sundays and legal holidays only are excepted.

It should be noted that Regulation No. 1 provides in effect that vessels plying between Pensacola and all ports, except Mobile and New Orleans, may dock at the Pensacola terminals of this company.

## PORT ARTHUR, TEX.

The town of Port Arthur is situated in southeastern Texas, on the west bank of Sabine Lake, at the head of the Port Arthur Canal and at the mouth of the Sabine-Neches Canal. Sabine Lake, which is a very shallow body of water 20 miles long and 7 miles in average width, is on the boundary line between Texas and Louisiana. Into the northern end of this lake flow the Sabine River, 550 miles in length, and the Neches River, 300 miles in length.

The Sabine-Neches Canal parallels the west bank of Sabine Lake and connects the Port Arthur Canal with the Sabine and Neches Rivers. The Federal Government is now at work on a 25-foot channel through the Sabine-Neches Canal and up the Neches River to Beaumont and up the Sabine River to Orange. Beaumont is approximately 50 miles from the Gulf, while Orange is about 39 miles.

The Port Arthur Canal is 7 miles in length and 27 feet deep, with a bottom width of 150 feet and a top width of 270 feet. This canal was built in 1894 by the Port Arthur Channel & Dock Co. (now known as the Port Arthur Canal & Dock Co.), a subsidiary of the Kansas City Southern Railway, to connect with the waters of Sabine Pass and thus provide deep-water terminals for the railway. The turning basin of the head of the canal is 16.8 miles from the Gulf.

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The Port Arthur Canal, with a strip of land about 150 feet wide on the west bank and the turning basin and lumber basin at the head of the canal, were conveyed to the United States free of cost by the Port Arthur Canal & Dock Co. on December 13, 1906. The canal has since been widened and deepened at the expense of the Federal Government.

Deep-water navigation at Port Arthur was extended by private enterprise in 1911, when the Gulf Refining Co., under permit from the Federal Government, improved and deepened Taylors Bayou from the head of Port Arthur Canal to its refineries, a distance of 1½ miles. Only a portion of the bayou was thus improved, a new channel being cut for a considerable distance to provide a straight course. The channel was dredged to a depth of 26 feet and the bayou was widened at the refinery so as to make a turning basin 400 feet wide and 1,600 feet long.

**Railroads.**—The only railroad that directly serves this port is the Kansas City Southern, with its subsidiary, the Texarkana & Fort Smith. The Southern Pacific Railway has considerable unimproved deep-water frontage and has a connection with the Texarkana & Fort Smith Railway, which performs what is practically a switching service between the Port Arthur docks and the Southern Pacific, a distance of about 1½ miles. For this service the Texarkana & Fort Smith demands a division of the through-rail rate, based on the mileage from Beaumont, even though the traffic is carried only 1½ miles.

The commercial interests of Port Arthur complain that this practice of the Texarkana & Fort Smith Railway operates to the great detriment of the port, in that it practically shuts out the Southern Pacific.

As examples of the manner in which the division of the through-rail rate operates, the following cases are cited:

A car of cotton moving from Dallas via the Southern Pacific for export through Port Arthur must be delivered to the Texarkana & Fort Smith Railway at Beaumont, or the Texarkana & Fort Smith Railway will accept this car of cotton from the Southern Pacific Railway at Port Arthur upon a guaranty of payment of the Beaumont division, which is 6 cents per 100 pounds.

Some time ago the Texas Export & Import Co., operating a cottonseed-crushing mill on the property of the Port Arthur Canal & Dock Co., purchased several cars of bags from New Orleans, which were routed to Port Arthur via the Southern Pacific. When these bags reached Port Arthur the Texarkana & Fort Smith Railway declined to switch to the consignee's place of business, claiming that the cars should have been routed care its line at Beaumont and demanding the Beaumont division on the shipment before switching them to the consignee's warehouse. The Southern Pacific was compelled to comply with the demand of the Texarkana & Fort Smith Railway in order to make delivery of these cars.

Recently a carload shipment moved into Port Arthur via the Southern Steamship Co. destined to Sabine, Tex. This shipment was unloaded on the docks of the Port Arthur Canal & Dock Co. and turned over to the Texarkana & Fort Smith Railway, which company billed it to Sabine, routing via Beaumont, notwithstanding a direct connection with the Southern Pacific at Port Arthur, causing the consignee to pay a much greater charge than would have accrued on the shipment had delivery been made to the Southern Pacific here.

The Interstate Commerce Commission in June, 1913,[a] reported that—

The Southern Pacific gets to West Port Arthur over its own rails and reaches the docks by a switching movement of 1½ or 2 miles over the tracks of the Texarkana & Fort Smith. It thus has a direct line of its own practically up to the docks at Port

[a] Port Arthur Board of Trade v. Abilene & Southern Railway Co. et al., 27 I. C. C. Reports, p. 398.

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Arthur, with substantially the same mileage as that via its connection with the Texarkana & Fort Smith at Beaumont; yet it can not apparently avail itself of the longer haul via its own route to West Port Arthur without according the Texarkana & Fort Smith practically the same charges which the latter receives on traffic delivered to it at Beaumont. Out of the 52½-cent rate to Port Arthur, the Southern Pacific, if it carries the cotton to West Port Arthur, would have to yield the Texarkana & Fort Smith a division of 4½ cents per 100 pounds in the rate and absorb in addition thereto the wharfage charges of 1½ cents and a switching charge of $2.50 per car, which latter, on a 50-bale lot of cotton weighing 25,000 pounds, would be approximately 1 cent per 100 pounds. The aggregate of these deductions from the through rate, amounting to approximately 7 cents per 100 pounds, would leave the Southern Pacific only one-half cent per 100 pounds more than if it delivered the car to the Texarkana & Fort Smith at Beaumont. Thus the Texarkana & Fort Smith practicaly excludes from Port Arthur any cotton not delivered to it at Beaumont or at some of its northern junctions.

**Steamship lines.**—The Gulf Refining Co. and the Texas Co. operate a large number of tank ships and barges for their foreign and coastwise shipments of oil and gasoline. The principal lines engaged in the general foreign trade of the port, as reported in the Exporters' Encyclopedia for 1915, are as follows:

| Lines. | Sailings. | Ports of destination. |
|---|---|---|
| New York & Porto Rico Steamship Co.[a] | 1 monthly | Ports in Porto Rico. |
| Port Arthur Transatlantic line | 2 monthly | Liverpool and Bremen.[b] |
| Do | 1 monthly | Havre and Dunkirk. |
| Vogemann Line [a] | Regularly [c] | Antwerp, Rotterdam, Hamburg, Bordeaux, and Oporto.[b] |

[a] Freight only.
[b] Service to Bremen and Hamburg suspended during war in Europe.
[c] Frequency of sailings not reported.

The only coastwise line that calls regularly at Port Arthur is the Southern Steamship Co., which operates one boat weekly in each direction between Philadelphia, Galveston, and Port Arthur.

**Commerce of the port.**—The water-borne traffic at this port increased from 1,174,415 short tons in 1908 to 3,171,758 short tons in 1913 and 4,090,928 short tons in 1914.[a] The traffic is practically all outbound. The value of petroleum products formed more than four-fifths of the total value in 1913 and 1914. The commerce of the port in the calendar years 1913 and 1914 is summarized in the following statement:[a]

| Commodities. | 1913 | | 1914 | |
|---|---|---|---|---|
| | Short tons. | Value. | Short tons. | Value. |
| Petroleum products: | | | | |
| Crude, gas, and fuel | 1,434,295 | $10,017,297 | 2,236,520 | $14,200,129 |
| Gasoline and kerosene | 868,562 | 35,845,420 | 982,230 | 31,181,915 |
| Lubricating oil | 67,105 | 4,066,950 | 77,144 | 3,740,304 |
| Total | 2,369,962 | 49,929,667 | 3,295,894 | 49,122,348 |
| Cotton and cottonseed products: | | | | |
| Cotton | 19,826 | 4,575,120 | 7,963 | 1,531,350 |
| Cotton seed | 7,888 | 118,320 | ..... | ..... |
| Cottonseed meal | 47,174 | 943,480 | 59,105 | 1,477,625 |
| Total | 74,888 | 5,636,920 | 67,068 | 3,008,975 |

[a] Report Chief of Engineers, U. S. Army, 1914, p. 2340; idem, 1915, p. 2675.

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| Commodities | 1913 | | 1914 | |
|---|---|---|---|---|
| | Short tons. | Value. | Short tons. | Value. |
| Lumber and timber products: | | | | |
| Lumber | 231,687 | $2,647,840 | 153,375 | $1,928,138 |
| Logs | 155,209 | 646,705 | ..... | ..... |
| Staves | 24,029 | 400,480 | 20,216 | 336,928 |
| Total | 410,925 | 3,695,025 | 173,591 | 2,265,066 |
| Asphalt | 57,065 | 978,264 | 62,093 | 1,041,852 |
| Iron and steel | 9,980 | 399,200 | 20,479 | 819,160 |
| Rice | 7,006 | 420,330 | 8,980 | 673,515 |
| Wheat | 16,344 | 490,326 | 69,754 | 2,557,654 |
| All other | 225,588 | 584,422 | 393,069 | 1,325,488 |
| Grand total | 3,171,758 | 62,134,154 | 4,090,928 | 60,814,058 |

The following vessel classification is reported for the calendar year 1913: [a]

| Class of vessels. | Number of vessels. | | | Net register tonnage. |
|---|---|---|---|---|
| | American. | Foreign. | Total. | |
| Registered: | | | | |
| Steamers | 47 | 116 | 163 | 1,075,091 |
| Sailing | 2 | 4 | 6 | 11,658 |
| Gasoline | 7 | ..... | 7 | 6,472 |
| Barges | 28 | ..... | 28 | 265,258 |
| Unregistered barges | 22 | ..... | 22 | 136,822 |
| Total | 106 | 120 | 226 | 1,495,301 |

**Extent and ownership of water front.**—It is difficult to state the amount of deep-water frontage available at Port Arthur. The improved water front is about 3 miles south of the city proper at the head of Port Arthur Canal and its extension through Taylors Bayou.

The Port Arthur Canal & Dock Co. owns over 13,000 feet of frontage, including slips on the turning basin, with a depth of 26 feet or more, and 3,000 feet on Taylors Bayou, with a depth of only 10 feet. In addition, this company owns a long but narrow strip of land on the west side of the canal behind the strip ceded to the United States Government and a long, and for the most part, narrow strip between the west bank of Sabine Lake and the east side of the Port Arthur Canal. For terminal purposes neither of these strips is of much value to the dock company.

The Texas Co. occupies a peninsula that has about 3,500 feet frontage on the turning basin, where the depth of water is now 26 feet, and about 3,000 feet frontage on the Sabine-Neches Canal, which now has a depth of 25 feet.

The Gulf Refining Co. has about 1,000 feet frontage on the turning basin at the head of Taylors Bayou, which has a depth of 26 feet, and about 1,250 feet, with 10 feet depth, on the bayou proper.

The Southern Pacific Railway owns, on the west bank of Taylors Bayou, a narrow strip which is more than three-fourths of a mile in length and which extends back to its tracks. Opposite this tract this company owns an island which was made when the channel to the

[a] Report, Chief of Engineers, U. S. Army, 1914, p. 2339; idem, 1915, p. 2675.

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head of Taylors Bayou was cut, and which has a frontage of about 2,500 feet on this new channel and of 4,000 feet on old Taylors Bayou, the former having a depth alongside of 26 feet and the latter of 10 feet.

**Terminals.**—The only important terminals now in use at Port Arthur are those of the Port Arthur Canal & Dock Co., the Texas Co., and the Gulf Refining Co.

The wharves of the Texas Co. and the Gulf Refining Co. are used almost exclusively for shipping petroleum products. The Texas Co. wharf is about 1,200 feet in length. This wharf is connected by pipe lines which extend to refineries about 2 miles distant and are equipped with pumps that fill tank steamers alongside the wharf. At the present time 648 feet of additional wharf is under construction. A spur track of the Kansas City Southern Railway extends to this property.

The wharf of the Gulf Refining Co. is 1,050 feet in length. The refineries are close to the wharf and facilities are at hand for filling as many as five tank steamers at one time. This wharf is connected by spur tracks with both the Kansas City Southern and the Southern Pacific Railroads.

The terminals of the Port Arthur Canal & Dock Co. are the only general merchandise wharves at this port and consist of the following:

Dock 1, known as the cotton dock, which has a frontage of about 2,200 feet on Slip 3. This wharf is about 250 feet wide. It has a frame warehouse 2,100 feet long and 90 feet wide used chiefly for cotton.

Dock 2, known as the meal dock, which lies between Slip 3 and Slip 2. This wharf has a frontage of 2,375 feet on Slip 3 and of 1,625 feet on Slip 2, and is 375 feet wide. It has a frame warehouse about 1,450 feet long and 90 feet wide.

Dock 3, which is an open wharf and is used chiefly for lumber. This wharf is about 125 feet wide and has a frontage of 1,800 feet on Slip 2. On the west side of this wharf is a timber basin built by the Long-Bell Lumber Co. for the storage of logs and lumber.

Dock 4, which also is a lumber wharf. It is about 2,000 feet in length. On this wharf are two lumber warehouses, one of which is about 1,400 feet long and 117 feet wide and the other 600 feet long and 117 feet wide. The latter is the property of the Long-Bell Lumber Co.

In the rear of Dock 2 is a grain elevator of 400,000 bushels capacity, built of frame with galvanized-iron sheathing.

The only terminal owned by the municipality of Port Arthur is in the town itself on the Sabine-Neches Canal at the foot of Shreveport Avenue and consists of a slip 200 feet long and 80 feet wide. The canal is used only by small boats and the municipal terminal therefore is of very little importance.

**Type of wharf construction.**—The wharves of the Port Arthur Canal & Dock Co. and the Texas Co. are of creosoted pile-and-timber construction, while the wharf of the Gulf Refining Co. is of concrete construction. The wharves of the Port Arthur Canal & Dock Co. are located on slips, while those of the other companies are parallel to the canal.

**Port administration.**—There is practically no port administration. All of the important terminals are privately owned and are outside of the town limits of Port Arthur.

An act passed by the thirty-third legislature of the State and known as S. B. 298 authorizes—

Cities situated along or upon navigable streams and acting under special charters to extend by ordinance their boundaries so as to include in said cities the navigable

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streams and the land lying on both sides for a distance of 2,500 feet from the thread of the stream to a distance of 20 miles or less in an air line from the ordinary boundaries of said city, either above or below the boundaries of said city, or both; and granting to said cities within said territory the right to purchase or condemn property for navigation or wharfage or for aids or facilities to either; and granting to said city within said territory full power of regulation and control over navigation and wharfage and over all facilities and aids to either; and full power to pass and enforce ordinances for the police of navigation and wharfage and of all aids and facilities to either.

In conformity with the act, the city of Port Arthur has greatly extended its limits for port purposes, but its frontage within these limits is small and the private terminals described above are not within its jurisdiction or control.

Port Arthur has the commission form of government and the powers granted by the above act are vested in the commission. There is a harbor master appointed by the commission who has "personal charge of all the water front and slips and wharves under control of the city" and whose duty it is to see "that all the ordinances, rules, and regulations pertaining to the water front and city slips are strictly enforced and obeyed" and to "collect and account for all wharfage and dock charges."[a]

**Port charges.**—*Pilotage.*—The rate as fixed by the State is $4.50 per foot draft for pilotage from sea to sea.

*Towage.*—The prevailing rate for towing from sea to sea is $100 and for shifting from dock to dock $25. Vessels can come in, go out, and shift under their own steam, if desired.

*Harbor dues.*—No harbor dues are assessed at this port.

*Dockage.*—No dockage is assessed against any vessel receiving or discharging cargo at any dock of the Port Arthur Canal & Dock Co.

*Wharfage.*—A wharfage charge is assessed against all commodities passing over the wharves of the dock company. These charges, are, in general, the same as those at Galveston and Texas City.

## TAMPA, FLA.

The port of Tampa, as considered in this report, includes the city of Tampa and the town of Port Tampa. The latter is the original port and is situated on the west shore of the peninsula that lies between Old Tampa Bay and Hillsboro Bay. The city of Tampa lies at the mouth of the Hillsboro River and at the head of Hillsboro Bay and is about 9 miles from Port Tampa.

Port Tampa is connected with the Gulf of Mexico by a channel 26 feet deep at mean low water, 500 feet wide across the bar, and 300 feet wide in the bay, while a channel 2 miles long, 200 feet wide, and 24 feet deep at mean low water extends from Tampa Bay to a turning basin at the mouth of the Hillsboro River and connects Port Tampa with the city of Tampa.[b]

The harbor at the city of Tampa includes frontage on the Hillsboro River and on the Ybor Estuary, which is now being improved, as well as on three channels which lie on the three sides of Seddon Island.

The principal terminals at Tampa city are located on the channel that lies on the west side of Seddon Island and leads to the turning basin at the mouth of the Hillsboro River and on the channel that

[a] Chap. 7, sec. 11, of City Ordinances of Port Arthur.
[b] Report, Chief of Engineers, U. S. Army, 1914, p. 618.

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lies to the north of Seddon Island and extends from the turning basin to the Ybor Estuary.

A very considerable addition to the available deep-water frontage at Tampa city will be made when the project now under way for the improvement of the Ybor Estuary has been completed. Through this estuary a channel, 4,400 feet long, 500 feet wide, and 24 feet deep at mean low water, is being dredged at the expense of the Federal Government. To secure a Federal appropriation for this work the city of Tampa agreed to construct wharves or slips having an available length of not less than 1,400 feet, the same to be open to use by the general public under reasonable regulations and charges. The city agreed also to obtain such control of the property for at least 700 feet on each side of the proposed Ybor Channel throughout its length as would insure its use primarily in the interest of general commerce on equal terms to all. The city also guaranteed that all wharfage charges and regulations should be reasonable and fully controlled by the municipal authorities, subject to the approval of the Secretary of War.[a]

The city of Tampa has complied with the above conditions and plans for the development of the estuary have been made by the Board of Port Commissioners of Pensacola and approved by the Secretary of War. These plans call for a wharf 1,900 feet long at the head of the estuary, where there will be a turning basin, and for 10 piers, 5 on each side of the channel. These piers will be built at an angle of 45° and will be 987 feet long and 250 feet wide, the slips between the piers also to be 250 feet in width.

Along First Avenue and in the rear of the wharf at the head of the channel the city has acquired a right of way 100 feet wide for a municipal belt railway that will connect with all the railroads entering the city. The plan is to have the tracks of this belt line reach all of the proposed piers.

Work on the channel proper had been nearly completed in March, 1915, when the port was visited, but none of the piers had been built. Negotiations were then under way between the city and one or more of the private property owners for an exchange of the city's tract on the west side of the channel for other frontage. As soon as this exchange should be effected the plan was to begin work on the first unit, Pier 3, near the turning basin.

The Ybor Channel improvement has been described in considerable detail, first, because the plans are ingenious and provide for a large wharf frontage within a small distance (25,666 feet in a channel 4,400 feet long), and, secondly, because of the novel terms imposed by the Federal Government in appropriating for this improvement.

The mean range of tide at Tampa and at Port Tampa is 2.5 feet.

**Railroads.**—Tampa city is served by the Atlantic Coast Line Railroad and the Seaboard Air Line Railway, while Port Tampa is served by the Atlantic Coast Line Railroad only.

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[a] Report, Chief of Engineers, U. S. Army, 1914, p. 620.

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**Steamship lines.**—The following table shows the principal lines of coastwise and local steamships that call regularly at Port Tampa and Tampa city:

| Lines. | Sailings. | Ports of destination. |
|---|---|---|
| Port Tampa: | | |
| Peninsular & Occidental Steamship Co.. | 2 or 3 weekly..... | Key West, Havana. |
| Tampa city: | | |
| Favorite Line..... | 3 daily..... | Points on Tampa Bay and Manatee River. |
| Gulf & Southern Steamship Co..... | 6 monthly..... | New Orleans. |
| Lawrence Line..... | 3 monthly..... | Pensacola, New Orleans. |
| Mallory Steamship Co..... | 1 weekly..... | Mobile, Key West, New York. |
| Southern Steamship Co..... | .....do..... | Texas City, Port Arthur, Philadelphia. |
| Towles Line..... | .....do..... | Fort Myers, Key West. |

Throughout the year 1914 the Philadelphia & New Orleans Transportation Co. operated three freight vessels plying between Philadelphia, Charleston, Tampa, and New Orleans, but since the beginning of the present year (1915) these vessels have been used for the European trade from other ports.

All of the above lines are engaged in coastwise trade except the Peninsular & Occidental Line, which operates to Cuba. The foreign trade, which constitutes the bulk of the tonnage at this port, is carried in tramp steamers.

**Commerce of the port.**—In the calendar year 1913, which was a more nearly normal trade year than 1914 and is, therefore, preferable for purposes of discussion, the trade at Port Tampa and Tampa city combined amounted to 2,483,867 short tons, valued at $50,480,832. Slightly more than one-half of the total tonnage consisted of phosphate rock, but the value of this commodity was only about one-eighth of the value of all commodities handled at this port in 1913. A little more than one-half of the total value of the commerce consisted of general merchandise, the bulk of which, it is believed, was handled over the wharves at Tampa city.

The following statement contains a summary [a] of the water-borne traffic, both foreign and coastwise, at Port Tampa:

| Commodities. | Short tons. | | Value. | |
|---|---|---|---|---|
| | 1913 | 1914 | 1913 | 1914 |
| General merchandise..... | 260,291 | 313,263 | $25,610,000 | $22,350,500 |
| Phosphate rock..... | 1,263,894 | 997,816 | 6,319,470 | 4,989,080 |
| Tobacco, leaf..... | 5,000 | 5,000 | 5,000,000 | 5,000,000 |
| Oil..... | 306,140 | 263,011 | 4,017,672 | 3,448,012 |
| Hay and grain..... | 100,000 | 21,638 | 2,850,000 | 656,930 |
| Lumber and logs..... | 140,033 | 94,645 | 1,590,550 | 840,475 |
| Fruits, tropical..... | 19,209 | 27,775 | 1,200,000 | 700,000 |
| Naval stores..... | 8,870 | 4,382 | 842,000 | 168,710 |
| All other..... | 380,430 | 356,144 | 3,051,140 | 7,881,278 |
| Total..... | 2,483,867 | 2,083,674 | 50,480,832 | 46,034,985 |

**Extent and ownership of water front.**—Just how much of the water front at Port Tampa is available for terminals it is difficult to state, since none is available without a considerable expenditure for piers

[a] Report, Chief of Engineers, U. S. Army, 1914, pp. 2117-2118; idem, 1915, p. 2465.

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of great length to reach deep water or without very considerable dredging, the water being shoal for a great distance from the shore. The only terminals now at Port Tampa, those of the Atlantic Coast Line Railroad, were made possible only by building a pier nearly a mile in length.

At Tampa city, the total length of water front, including slips, is about 5½ miles, 3 miles on Seddon Island and 2 miles on the mainland facing Seddon Island, where the depth of water is 24 feet, and about one-half mile on Hillsboro River, where there is from 12 to 14 feet depth of water. The development of Ybor Estuary along the lines planned will add about 5 miles to the water front and the dredging of a 24-foot channel through Sparkman Bay to connect Ybor Estuary with Hillsboro Bay Channel will make a portion of the Tampa Northern Railroad property at Hookers Point accessible to deep water (24 feet) and will make it possible for the Seaboard Air Line Railroad, by extending Seddon Island to the harbor line, to give the east side of that island a deep-water frontage.

**Terminals**—*Port Tampa.*—The only terminals at Port Tampa are those of the Atlantic Coast Line Railroad. There are two slips on this property, one 2,600 feet long and 230 feet wide and the other, which is V-shaped, 380 feet long and 20 feet wide at the inner end and 180 feet wide at the outer end. The depth of water in the slips is about 22 feet. In addition, there is a wharf 480 feet in length.

These terminals are used by the Peninsular & Occidental Steamship Co., a subsidiary of the Atlantic Coast Line Railroad, which operates to Key West and Habana and moves a large volume of general merchandise and tobacco, and by numerous tramp steamers that call for phosphate rock. These terminals have three phosphate elevators which hoist phosphate rock from cars into ships.

*Tampa city.*—The most extensive terminals at Tampa city are those of the Seaboard Air Line Railway on Seddon Island. The railway company owns the entire island, which has deep-water frontage on the two principal channels now in use and will front also on the new deep-water channel to Ybor Estuary. Seddon Island was originally a small strip of land, but is being constantly enlarged and, when filled out to the harbor lines, will be triangular in shape and will cover a large area.

Only a portion of Seddon Island has as yet been improved. On the north side, facing the Hendry & Knight Channel, are a coal hoist and a lumber dock, and on the west side, facing the channel connecting the Hillsboro River with the channel to Port Tampa, there are two phosphate elevators. One of the phosphate elevators is now used only rarely. The other, which is of modern construction and efficient, is used very extensively. This elevator can load vessels at the rate of 750 long tons per hour. The elevator is close to the water's edge. The phosphate rock is raised from cars to the top of the elevator by means of two endless-chain conveyors with scoop buckets attached. Each bucket carries 1,000 pounds of phosphate and 14 buckets per minute can be loaded on each conveyor. As the buckets reach the top of the elevator they are automatically dumped into a chute that extends to the hold of the vessel.



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The only other water-terminal property at Tampa that is controlled by the Seaboard Air Line Railway is that of the Tampa Northern Railway division on Hookers Point, but this is as yet undeveloped.

Two private dock companies have done much to develop the water front at Tampa city. The pioneer was the Hendry & Knight Co., which has improved about 2,550 feet at the mouth of the Hillsboro River facing Seddon Island. Largely at its own expense this company widened and deepened the narrow channel between Seddon Island and the mainland. The Hendry & Knight Co. terminals are leased to a number of private concerns, among them the Mallory Steamship Co.

Adjoining the Hendry & Knight terminals on the east are the terminals of the Swann Terminals Co., which have a frontage on the Hendry & Knight Channel. These terminals are of recent construction and are as yet largely unimproved. The Swann interests also own considerable property on the west bank of the Ybor Channel.

All of the above terminals are located on water 20 to 24 feet in depth. In addition there are about 20 wharves on the Hillsboro River which have 12 to 14 feet of water. Most of these are small and are used by wholesale business concerns. Two local lines of steamboats, the Towles Line and the Favorite Line, have wharves on the river, while the only terminals owned by the city of Tampa are located at street ends on the river. These wharves, which are used for launches and other small craft, are each 60 feet in width.

**Type of wharf construction.**—The character of construction of the piers of the Atlantic Coast Line Railroad at Port Tampa has been described as follows:[a] "In the shore end for 3,000 feet the sides of the slips are wooden bulkheads with earth backing. The outer ends of slip for 500 feet are wooden-pier construction with piling protected by terra-cotta pipes."

At Tampa city the prevailing type of construction is that of pile-and-timber wharves parallel to the channels.

**Port administration.**—By an act of the Legislature of Florida in 1913,[b] the administration of port affairs at the city of Tampa was vested in a board of port commissioners consisting of seven members. The members constituting the first board were named in the act and are to hold office until 1916, when the members are to be chosen by popular vote for terms of four years. The compensation is $100 per annum. This act vests in the board of port commissioners the following powers:

1. To acquire, own, or use municipal docks and terminals, including railroads, within or adjacent to the limits of the said city deemed suitable to meet the present and future needs of the city. * * *
2. To provide for the improvement, maintenance, operation, and management of all such docks and terminals, including railroads.
3. To do any and all things within and outside said city limits reasonably necessary and advantageous to be done in connection with the acquiring, improving, operating, and management of such docks and terminals, including railroads.

The board is also given in specific terms full power of eminent domain.

The act provides that all revenues derived from water terminal properties shall be kept by the city treasurer in a separate account

[a] Special Report of Chief of Engineers, U. S. Army, on Water Terminal and Transfer Facilities, 1913 (H. Doc. No. 226, 63d Cong., 1st sess.), p. 744.
[b] Laws of Florida, 1913, ch. 6782, No. 362.

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and that all funds expended are to be drawn out for the purposes contemplated in this act upon warrants duly drawn and approved by the board of port commissioners.

While the act clothes the board with large powers, it also provides certain checks on the exercises of these powers. For example, while the board has full power to make leases, the act provides that "no lease shall at any time be made of the whole of such property, or any of such parts thereof, as will interfere with the furnishing by the port commissioners of ample dock and terminal facilities as municipal docks and terminals open to all on reasonable terms."

Purchases of real estate exceeding $15,000 in value can not be made without previous authorization by popular vote. Expenditures for real property valued at more than $5,000 but less than $15,000 can be made only with the unanimous consent of the board or with the consent of a majority ratified by election of the voters. Expenditures for real property exceeding $1,000 and less than $5,000 can be made with the consent of five of the seven members of the board.

Revenue is provided at the outset by a special tax, the act providing that "the city council shall levy annually a special tax of not less than 1 or more than 4 mills on the taxable property within the corporate limits of said city, as may be necessary, together with the net proceeds of the properties controlled by the port commissioners, or their successors, to pay the expenses of said port commissioners and the proper maintenance of said docks and terminals."

**Port charges.**—*Pilotage.*—The following rates of pilotage per foot are fixed by the board of pilot commissioners, a State board similar to that at Pensacola: 6 feet or less draft of vessel, $2; 6 to 8 feet, $2.50; 8 to 15 feet, $3; 15 feet and over, $3.50.

*Towage.*—Vessels carrying bulk cargo, such as phosphate rock and coal, pay 5 cents per ton of cargo for towing; lumber vessels pay 12½ cents per 1,000 feet b. m.; while vessels light must pay $65 from the ocean bar to the dock in Tampa and return. The charge for docking or undocking ranges from $15 to $20.

*Harbor dues.*—The harbor master is permitted to charge not more than $20 per vessel, and he collects the maximum in each case.

*Dockage.*—No charge is made for berths at any of the wharves, the entire burden resting on the cargo in the form of wharfage charges.

*Wharfage.*—The rates of wharfage on the principal commodities handled over wharves at Tampa city are as follows: Phosphate rock, 25 cents per ton; lumber, 25 cents per 1,000 feet b. m.; coal, 15 cents per ton; cement, 15 cents per ton.

*Switching.*—A flat rate of $5 per car is made for switching to and from the wharves.

## TEXAS CITY, TEX.

Texas City is on the mainland of Texas about 8 miles northwest of Galveston. The channel which connects Texas City with Galveston Harbor had, on June 30, 1914, the following dimensions: For a distance of 5,187 feet from the wharf, a width of 200 feet and a depth of 27 feet; for the next 17,500 feet, a width of 100 feet and a depth of 25 feet.[a] The river and harbor act of March 4, 1913, provides for

[a] Report, Chief of Engineers, U. S. Army, 1914, p. 799.

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the improvement of the channel to a depth of 30 feet and to a width of 300 feet.[a] The tides in Galveston Bay are irregular, varying considerably with the wind.

Texas City is a new port. Prior to 1910 there were few wharves and little commerce at this point, but since that time a large investment in modern terminals has been made and the commerce has increased rapidly.

The port and city have been developed largely by private individuals who purchased approximately 5,000 acres of land and in 1895 and 1896 dredged a channel 16 feet deep at an expense of $146,000. Later, when the United States Government improved the channel to a depth of 25 feet, these interests paid the cost of superintendence, inspection, etc. In addition they have since expended, according to figures furnished by them to the War Department, $148,907 in completing the channel, $172,735 in digging a turning basin and slip, and $16,029 in maintaining the channel.

The ownership and control of the real estate, the railroad, and the terminal properties, including the terminal railroad, wharves, grain elevator, and warehouses, are vested in three separate corporations, namely, the Texas City Land Co., the Texas City Transportation Co., and the Texas City Terminal Co. The Interstate Commerce Commission found in April, 1913, that although nominally the three corporations were distinct, in reality they constituted one beneficial ownership, under one general control and direction.[b] Officials of the Texas City Terminal Co. assert that at the present time there is no connection between that company and the Texas City Land Co.

**Railroads.**—The only railroad that enters Texas City is the Texas City Terminal Co., which owns 6½ miles of main track and about 26 miles of sidings. The main track of this company originally extended from the wharves to Terminal Junction, about 4.36 miles distant, where connection is made with the Galveston, Harrisburg & San Antonio, the Galveston, Houston & Henderson, the International & Great Northern, and the Missouri, Kansas & Texas Railroads. The rails were afterwards extended 2.15 miles to Texas City Junction where connection was made with the Trinity & Brazos Valley Railroad (not now operating to this point) and the Gulf, Colorado & Santa Fe Railroad.

All cars destined for the terminals at Texas City are turned over to the Texas City Terminal Co. at Terminal Junction or Texas City Junction and are moved by the engines of the terminal company. For this service the company received, prior to August 1, 1912, a division of the through-rail rate, but upon complaint of the Galveston Wharf Co. and other Galveston interests the Interstate Commerce Commission ordered that a switching allowance of $3.50 per loaded car be substituted.

**Steamship lines.**—The only regular lines of steamships calling at this port are the Southern Steamship Co., which operates one boat weekly in each direction between Philadelphia, Tampa, Texas City, and Port Arthur, and the Wolvin Line, which maintains a weekly freight and passenger service to Tampico and Vera Cruz, Mexico.

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[a] Report, Chief of Engineers, U. S. Army, 1914, p. 880.

[b] In the matter of wharfage charges of the Galveston Wharf Co., at Galveston, Tex., decided Apr. 15, 1913, 26 I. C. C. Reports, p. 696.

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The principal commodity handled at this port is cotton, and this is carried almost entirely by steamers of the Elder-Dempster Line, the Harrison Direct Line, and the Leyland Line, which call at irregular intervals. It is interesting in this connection to quote the following statement from the Annual Report of the Chief of Engineers, United States Army, for 1914:[a]

The effect of the project on freight rates has been beneficial owing to the establishment of a line of steamers from New York to Texas City, thereby breaking up the rate agreement that had existed between the old lines between New York and Galveston. Prior to the establishment of this line in 1908 the rates by the steamship lines from New York and points in seaboard territory to points in Texas were the highest figures that ever were in effect, notwithstanding the fact that the deepening of the Galveston Harbor Channel had been continuously going on and at that date was about 30 feet. But with the competing line in operation to Texas City the rates were reduced on an average of 51 per cent, and the volume of the business has increased over 300 per cent. However, during the past three years the rates have advanced again, the average increase being about 75 per cent over the rates of 1908, and on a parity with Galveston.

**Commerce of the port.**—The growth of the commerce at this port is shown in the following tabular statement:[b]

| Calendar year. | Foreign. | | Domestic. | | Total. | |
|---|---|---|---|---|---|---|
| | Short tons. | Value. | Short tons. | Value. | Short tons. | Value. |
| 1904 | 36,138 | $3,745,888 | ..... | ..... | 36,138 | $3,745,888 |
| 1905 | 60,321 | 5,362,977 | ..... | ..... | 60,321 | 5,362,977 |
| 1906 | 58,258 | 3,697,757 | ..... | ..... | 58,258 | 3,697,757 |
| 1907 | 58,245 | 4,446,173 | 19,219 | $2,401,600 | 77,464 | 6,867,773 |
| 1908 | 59,072 | 3,403,960 | 96,927 | 18,201,566 | 155,999 | 21,605,526 |
| 1909 | 38,799 | 3,074,444 | 141,200 | 31,064,000 | 179,999 | 34,138,444 |
| 1910 | 72,694 | 14,542,428 | 313,046 | 33,300,767 | 385,740 | 47,843,195 |
| 1911 | 145,820 | 28,372,487 | 303,867 | 23,151,774 | 449,687 | 51,524,261 |
| 1912 | 247,625 | 45,113,206 | 216,612 | 17,887,230 | 464,237 | 63,000,436 |
| 1913 | 212,888 | 36,718,421 | 233,340 | 16,075,926 | 446,228 | 52,794,347 |
| 1914 | 193,863 | 25,829,896 | 107,243 | 6,190,286 | 301,106 | 32,020,182 |

The foreign trade of the port consists almost entirely of exports, imports amounting in 1913 to only 8,780 short tons, valued at $2,198,919, as compared with exports of 204,108 short tons, valued at $34,519,502. Figures for 1913 are discussed, since that year was a more nearly normal trade year than 1914, the latest year for which data are available.

Cotton for foreign shipment is the principal commodity handled at the port of Texas City, the value of export cotton in 1913 being $31,626,810, or three-fifths of the total value of the commerce of the port and more than nine-tenths of the value of the exports. The only other important commodity exported through this port in 1913 was grain, which was valued at $1,014,377. The only important items listed among the imports at Texas City in 1913 were general merchandise, valued at $1,333,868, and coffee, valued at $579,336.

[a] Report, Chief of Engineers, United States Army, 1914, p. 801.
[b] Idem, 1914, p. 801; idem, 1915, p. 2632.

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The principal commodities handled in the coastwise trade at this port in 1913 and 1914 were valued as follows:[a]

| Commodities. | Short tons. | | Value. | |
|---|---|---|---|---|
| | 1913 | 1914 | 1913 | 1914 |
| Miscellaneous merchandise | 22,654 | 2,528 | $5,210,232 | $252,800 |
| Dry goods and notions | 4,075 | 1,791 | 2,786,933 | 849,230 |
| Wire goods, nails, and copper wire | 34,335 | 33,959 | 2,007,190 | 1,697,950 |
| Hardware, tools, etc | 3,698 | 3,543 | 1,016,785 | 974,325 |
| Steel rails | 29,111 | ..... | 1,014,279 | ..... |
| Machinery | 4,215 | 756 | 809,315 | 145,152 |
| All other | 135,252 | 64,666 | 3,231,192 | 2,270,829 |
| Total | 233,340 | 107,243 | 16,075,926 | 6,190,286 |

In regard to the trade in wire goods, nails, etc., it is interesting to note that an important steel and wire company ships large quantities of these commodities by water to Texas City where they are stored in the warehouses of the Texas City Transportation Co. to be shipped by rail, as ordered, to points in the Southwest.

The cotton traffic of the port has developed rapidly, this rapid development being due largely to the fact that there is no wharfage charge on cotton at Texas City, whereas at Galveston a charge of 1½ cents per 100 pounds is made, and in part also to the fact that on several occasions the wharves at Galveston have become seriously congested. Galveston interests objected to the free-wharfage rule and the division of the rail rate at Texas City, the latter being large enough, they claimed, to enable the Texas City interests to maintain free wharfage and offer other inducements to attract traffic.

The Interstate Commerce Commission justified the practice of free wharfage but ordered a switching allowance of $3.50 per loaded car to be substituted for the division of the through-rail rate. This allowance, it should be stated, is made out of the through-rail rate and is not a separate charge paid by consignor or consignee. In its opinion the commission said:

> Besides being some miles farther up the bay than Galveston, the condition of the channel to Texas City makes it undesirable for vessels to attempt to make the port at night, as they can safely do at Galveston. Moreover, vessels usually require the services of a tug into or out of the port, and this involves a substantial expenditure that is not necessary at Galveston. * * * There is apparently some force in the statement made by the Texas City interests that Texas is in need of an additional port.[b]

The following is a classification of the vessels engaged in the trade at this port in the calendar year 1913:[c]

| Class of vessels. | Number of vessels. | | | Net register tonnage. |
|---|---|---|---|---|
| | American. | Foreign. | Total. | |
| Foreign vessels in and out | ..... | 167 | 167 | 385,481 |
| Coastwise | 226 | ..... | 226 | 351,584 |
| Barges | 85 | ..... | 85 | ..... |
| Total | 311 | 167 | 478 | 737,065 |

[a] Report, Chief of Engineers, United States Army, 1914, p. 2295; idem, 1915, p. 2631.
[b] In re wharfage charges of the Galveston Wharf Co. at Galveston, 26 I. C. C. Reports, pp. 699 and 700.
[c] Report, Chief of Engineers, United States Army, 1914, p. 2294.

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**Extent and ownership of water front.**—The length of the improved water front is 6,450 feet, all of which is owned by the Texas City Transportation Co. This company also owns a great length of unimproved water front.

**Terminals.**—The terminals are of modern construction, well arranged, and efficiently equipped.

The following is a list of the warehouses, with their dimensions, character of construction, and use:

| Warehouses. | Floor space. | Length. | Width. | Height. | Character of construction. |
|---|---|---|---|---|---|
| On water front: | *Sq. feet.* | *Feet.* | *Feet.* | *Stories.* | |
| A-1 | 135,520 | 880 | 154 | 1 | Steel and corrugated iron. |
| A | 143,440 | 880 | 163 | 1 | Concrete. |
| B | 87,750 | 1,170 | 75 | 1 | Frame. |
| C | 75,000 | 750 | 100 | 1 | Concrete. |
| D | 75,000 | 750 | 100 | 1 | Do. |
| E | 62,760 | 523 | 120 | 1 | Do. |
| On land: | | | | | |
| 1 | 91,800 | 1,020 | 90 | 1 | Frame. |
| 2 | 27,610 | 251 | 110 | 1 | Concrete and steel. |
| 3 | 27,610 | 251 | 110 | 1 | Do. |
| 4 | 27,610 | 251 | 110 | 1 | Do. |
| 5 | 27,610 | 251 | 110 | 1 | Do. |

Besides the warehouses there is a cotton compress and storage shed, of frame construction, 2,000 feet long and 96 feet wide. It is said that 1,500 bales of cotton per day can be handled at this compress and there is space for storing under cover 12,000 bales.

A modern reinforced-concrete grain elevator, which is electrically operated and has a capacity of 500,000 bushels, is also a part of the terminal facilities of this port, and in the rear of warehouse E there is a coal bin, 60 feet by 480 feet, and two electric bridge cranes, each of 2½ tons capacity, for loading and unloading coal and other bulk freight.

The handling facilities at this port are unusually good. Coal, steel rails, ores, etc., are handled by means of the electric bridge cranes. Ships' tackle is used largely for other commodities which are trucked from the ship's side to the warehouse or car. Warehouses C and D on the water front and land warehouses 2, 3, 4, and 5 are equipped with electric traveling cranes. The traveling cranes in warehouses C and D, which are used for storage of steel and wire products, are provided with electric-magnet attachments for lifting kegs of nails, bales of barbed wire, and other similar products and stacking them to a height of 25 feet.

**Character of wharf construction.**—All the wharves are built on creosoted piles and have timber decks or platforms.

**Port administration.**—All of the port facilities are privately owned and controlled and no municipal control is exercised.

**Port charges.**—*Pilotage.*—The pilotage rates per foot draft charged by the Galveston Pilots' Association, operating in Greater Galveston Harbor, for vessels handled in and out of Texas City, are as follows, together with the net register tonnage of vessels: 1,500 tons and over, $4; 1,000 to 1,500 tons, $3.75; 500 to 1,000 tons, $3.50; less than 500 tons, $3.

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*Towage.*—The following towage charges are made at Texas City by a prominent towing company operating in Greater Galveston Harbor:

| | |
|---|---|
| Towing loaded steamer from, in, or near Bolivar Roads (harbor entrance) to Texas City (about 8 miles) | $65.00 |
| Towing loaded steamer from Texas City to Bolivar Roads | 75.00 |
| Towing schooner from outside bar, per gross ton | .18 |
| Towing schooner from inside bar, per gross ton | .15½ |
| Shifting steamer at Texas City without pilot | 45.00 |
| Shifting loaded barges, Texas City to Galveston | 35.00 |
| Shifting barges inside harbor, per shift | 10.00 |
| Shifting light barges, Galveston to Texas City and vice versa | 25.00 |

*Harbor dues.*—No harbor dues are assessed at this port.

*Dockage.*—No charge for berthing is made for any vessel delivering or taking cargo at the wharves of the terminal company.

*Wharfage.*—The rates of wharfage at Texas City terminals are the same as those of Galveston and Port Bolivar. Prior to September 1, 1913, free wharfage on all commodities was the rule at Texas City, but since that time cotton and coal are the only articles on which no wharfage charge is made. With these two principal exceptions and a few minor ones, the wharfage charges at Texas City, Port Bolivar, and Galveston, all competing ports, are identical.

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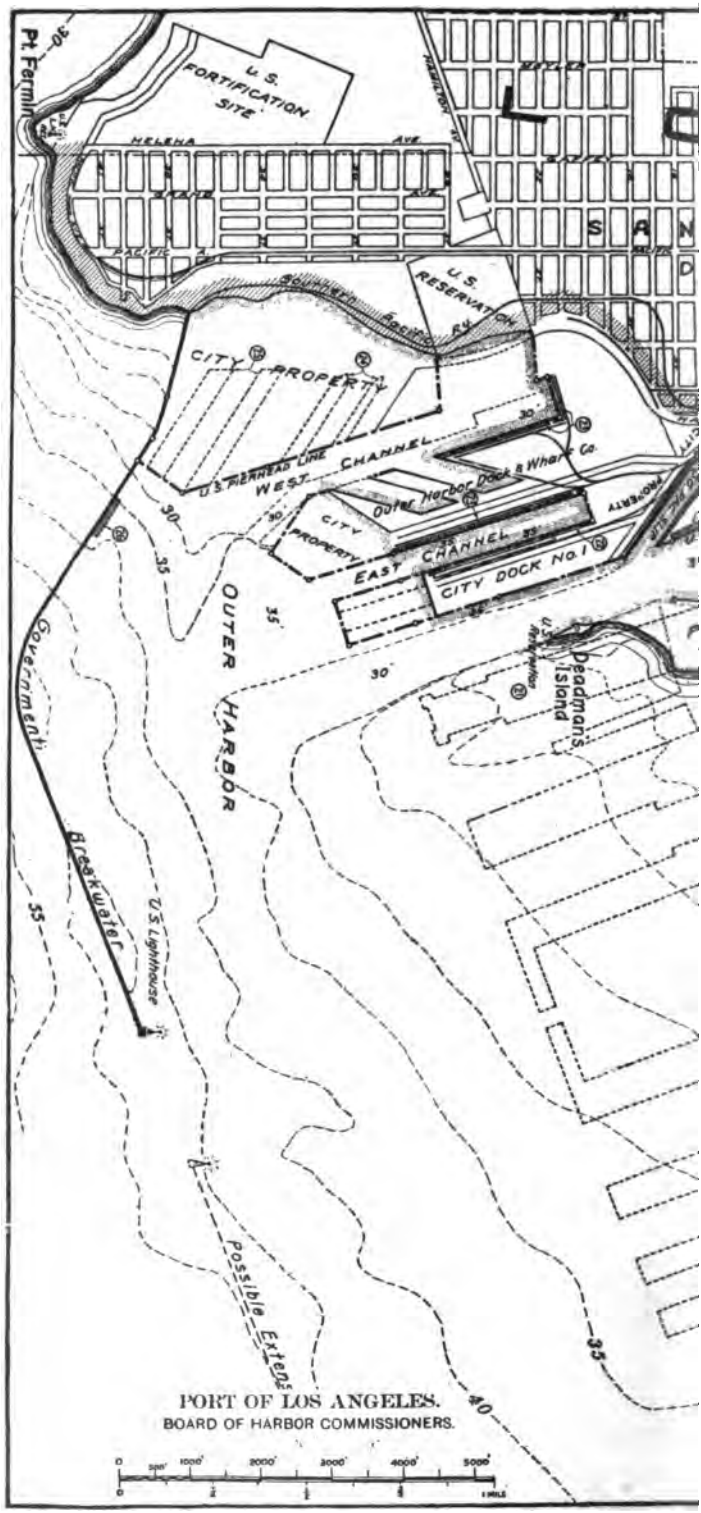


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# CHAPTER IV.

# PACIFIC COAST PORTS.

## LOS ANGELES, CAL.

This harbor is unique in the fact that it is situated about 20 miles from the business center of the city to which it belongs. In order to have a harbor within its corporate limits the city of Los Angeles extended its boundaries by annexing what is known as the Shoestring Strip, a strip of land which is only a quarter of a mile wide and extends from the old boundaries to the limits of the small harbor towns of San Pedro and Wilmington. The first move toward annexation was made in 1906, but it failed because of the refusal of the legislature to give its approval. Annexation was, however, accomplished in August, 1909, the city of Los Angeles having agreed to adopt a policy whereby $10,000,000 should be expended in harbor development by the city within 10 years.

Los Angeles Harbor is 452 miles south of San Francisco and 102 miles north of San Diego. It consists of two parts, the outer, or breakwater, harbor, formerly designated San Pedro Harbor, and the inner harbor, formerly designated Wilmington Harbor.

Originally San Pedro Harbor was an open roadstead with a considerable amount of kelp. The bay was well protected on the west by the bluff which terminates at Point Fermin, but was exposed to the southeast, south, and southwest. The construction by the Federal Government of a massive breakwater 11,152.5 feet in length has resulted in the creation of an excellent outer harbor. The Chief of Engineers, United States Army, reports that "there is now afforded a harbor of refuge, easy of access and secure from storms, for vessels of the largest size."[a] A map of the harbor is shown opposite this page.

The protected area in the outer harbor consists of 490 acres, with a depth of 30 to 50 feet at mean lower low water, and 120 acres beyond established harbor lines, with a depth of 24 to 30 feet at mean lower low water. Two channels 30 to 35 feet deep have been dredged by the city of Los Angeles and by private enterprise. Each channel is about 5,500 feet long and extends alongside existing wharves or wharves that are under construction. The average rise of tides is 5 feet.

Large areas in the outer harbor have been reclaimed by the city and by private interests. The Outer Harbor Dock Wharf Co. has reclaimed about 132 acres, around which it has constructed 11,850 linear feet of bulkhead. The Pacific Wharf & Storage Co. has constructed a stone bulkhead by means of which an area of about 80 acres will be reclaimed. The San Pedro, Los Angeles & Salt Lake Railroad Co. has also bulkheaded and reclaimed with material deposited by the Government dredge an area of about 81 acres. And the city of Los Angeles has reclaimed an area of about 79 acres.[b]

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[a] Report, Chief of Engineers, U. S. Army, 1914, p. 1311.
[b] Idem, pp. 1311–1312.



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Extensive improvements have also been made in the inner harbor. This harbor originally had at the present entrance a depth of less than 2 feet at low tide and consisted of Wilmington Basin and Wilmington Lagoon, a large expanse of shallow water connected with San Pedro Bay by only one good channel.

As a result of considerable dredging and other work a large inner harbor has been created, which now contains an area of 770 acres beyond the pierhead line. The Federal Government has dredged 184 acres of the total area of this harbor to a depth of 30 feet and 16 acres to a depth of 25 feet and in addition has constructed a channel 9,000 feet long, 200 feet wide, and 20 feet deep in the east basin and a channel 5,100 feet long, 150 to 200 feet wide, and 20 feet deep in the west basin. A portion of the east basin channel has been deepened by the city of Los Angeles to 30 feet.

Much of the improvement of the inner harbor has been made at the expense of the city of Los Angeles and private interests. The city has dredged the Mormon Island Channel and also a large area in Wilmington Basin. The San Pedro, Los Angeles & Salt Lake Railroad Co. has provided a channel 2,400 feet long, 60 to 100 feet wide, and 20 feet deep, and the Consolidated Lumber Co. a channel 3,500 feet long, 200 feet wide, and 20 feet deep.

From the outer harbor up to and through the turning basin, a distance of 2½ miles, the depth of channel is 30 feet. In the Wilmington Basin and the Mormon Island Channel the prevailing depth is 30 feet, but in certain berths a depth of 34 feet has been provided by the city. In the channel in the east basin the depth ranges from about 30 feet at the southern end to about 20 feet at the northern end, while the west-basin channel has a depth of 20 feet. Large areas in the inner harbor also are being reclaimed by the city.

Considerable space has been devoted to the description of the improvement of the harbor of Los Angeles because of the fact that an excellent artificial harbor has been created within a comparatively short time and under adverse circumstances of a political as well as a physical character. At a time such as the present, when interest in the development of municipal water terminals is widespread, it is thought pertinent to describe in detail how this city has solved its unusual harbor problems.

**Railroads.**—The port of Los Angeles is served by the Pacific Electric Railway Co., the San Pedro, Los Angeles & Salt Lake Railroad Co., and the Southern Pacific Co. All of these railroads occupy property on the water front under leases, franchises, or other permits. The Santa Fe Railway also reaches Los Angeles, but its lines do not extend to the port.

The city of Los Angeles planned originally to build a municipal marginal or belt-line railway to serve all the terminals along the water front and condemnation proceedings were instituted to secure a right of way. It was found, however, that the cost would be very great and that long litigation must first ensue. To avoid delays, a compromise agreement has recently been entered into between the city and the Pacific Electric Railway Co., which is a subsidiary of the Southern Pacific Co., and operates several hundred miles of railway in the vicinity of Los Angeles.

The secretary of the harbor board describes the terms of this agreement in the following words:

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I have recently negotiated with the Pacific Electric Railway Co. to handle cars on the city's rails, paying the city therefor in the case of cars of the Pacific Electric and performing the switching service also in the case of cars of other roads. For such service we will collect a switching charge from the railroad getting the line haul, out of which we will pay the Pacific Electric for performing the physical work of switching. I have this plan agreed upon with the Pacific Electric and think it will be in operation within a few weeks.

**Steamship lines.**—The principal coastwise or coast-to-coast lines of steamships that call regularly at the port of Los Angeles are the following:

American-Hawaiian Steamship Co., which operates a large fleet between a number of ports on the Atlantic and Pacific coasts via the Panama Canal. On the average two vessels per week call at Los Angeles on the westbound voyage from New York City to San Francisco, Portland, and Seattle or Tacoma. On the eastbound voyage there are, on the average, about two calls per month. Included in the above is one passenger and freight vessel, which makes one trip a month from Boston to Seattle and calls at Los Angeles as well as at the other ports named.

Atlantic and Pacific Line (W. R. Grace & Co.), which operates a line between New York and Pacific coast ports, including Los Angeles, with one boat in each direction, approximately every three weeks.

Independent Steamship Co., which maintains a schedule of three boats weekly in each direction between Los Angeles and San Francisco.

Luckenbach Steamship Co., which operates a large fleet of freight vessels via the Panama Canal between the ports of New York, Los Angeles, and San Francisco, and maintains a service of one boat weekly in each direction.

North Pacific Steamship Co., which operates one boat weekly in each direction between San Diego, Los Angeles, Santa Barbara, San Francisco, and Portland.

Pacific Coast Steamship Co., which operates two boats weekly in each direction between Seattle, Victoria, British Columbia, San Francisco, Los Angeles, and San Diego.

Pacific Navigation Co., which operates four boats weekly in each direction between San Diego, Los Angeles, and San Francisco.

Panama Pacific Line, which operates the *Finland* and the *Kroonland*, vessels of 22,000 tons displacement, between New York and San Francisco via the Panama Canal. During the period from May 1 to November 20, 1915, these boats will make eight calls at Los Angeles on the westbound and nine calls on the eastbound voyage.

San Francisco & Portland Steamship Co., which maintains a schedule of six sailings monthly in each direction between Los Angeles, San Francisco, Astoria, and Portland.

Wilmington Transportation Co., which operates a passenger-excursion steamer between Los Angeles and Santa Catalina Island, making one round trip daily.

The principal lines of steamships engaged in foreign trade that call regularly at Los Angeles are the following:

Blue Funnel Line, which operates one boat monthly between Pacific coast ports and England via the Orient and the Suez Canal.

East Asiatic Co. (Ltd.), which operates one boat monthly between Pacific coast, Central American, and Scandinavian ports.

Harrison Direct Line, which operates one boat monthly between Pacific coast ports and Liverpool, London, and Glasgow.

Johnson Line, which operates one boat monthly between Pacific coast, Central American, and Scandinavian ports.

The following is a classification of the vessels calling at this port during the calendar year 1913: [a]

| Class of vessels. | American. | Foreign. | Total. | Net register tonnage. | Passengers. |
|---|---|---|---|---|---|
| Registered: | | | | | |
| Steamers | 27 | 43 | 70 | 194,314 | 179 |
| Unregistered: | | | | | |
| Steamers | 2,708 | ..... | 2,708 | 2,557,950 | 222,810 |
| Sailing vessels | 64 | ..... | 64 | 27,388 | ..... |
| Barges | 8 | ..... | 8 | 14,072 | ..... |
| Total | 2,807 | 43 | 2,850 | 2,793,724 | 222,989 |

[a] Report, Chief of Engineers, U. S. Army, 1914, p. 3143.

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**Commerce of the port.**—The water-borne commerce of the port in the calendar year 1914 amounted to 1,734,752 short tons, valued at $76,696,764.[a] In the year 1913, which was a more nearly normal trade year and is therefore preferable for purposes of discussion, it amounted to 1,727,876 short tons, valued at $94,266,762.[b] From the standpoint of value, general merchandise was the principal item in 1913, its value being $70,866,080, or more than seven-tenths of the total. It should be noted, however, that general merchandise has been valued at $320 per short ton, which appears to be a very high average for this class of commodities. Next in value were the following items: Lumber and timber products, $10,752,211; miscellaneous, $3,864,100; grain, $2,290,500; paper, $1,951,000; and oils, $1,622,355.

From the standpoint of tonnage, lumber and timber products, constituted the item of greatest volume. Los Angeles is said to be the largest lumber-receiving port in the world. In the year 1913, 1,087,036 short tons of lumber, laths, shingles, logs, piles, etc., were received.

The data available do not show separately the volume of the coastwise and the foreign trade. The only statistics of the foreign trade of this port are those compiled by the Bureau of Foreign and Domestic Commerce, which relate to the fiscal year ended June 30, 1913. These figures show that the imports at Los Angeles in that year were valued at $2,747,701, and the exports at $203,805, and consisted, respectively, of the following principal items:

| Commodities. | Value. | Commodities. | Value. |
|---|---|---|---|
| IMPORTS. | | EXPORTS. | |
| Fertilizers | $268,355 | Automobiles | $60,825 |
| Coffee | 162,894 | Manufactures of iron and steel | 30,896 |
| Seeds | 143,117 | Fruits | 28,142 |
| Tea | 108,220 | Cement, hydraulic | 22,140 |
| Earthen, stone, and china ware | 100,930 | Asphaltum, manufactures of | 13,251 |
| All other | 1,964,085 | All other | 48,551 |
| Total | 2,747,601 | Total | 203,805 |

**Extent and ownership of water front.**—Approximately 20¾ miles of water front along the Government harbor lines are now available at the port of Los Angeles. The following statement shows the present frontage in the several parts of the harbor, with the additional frontage which, it is stated, could be made by the construction of slips:

[a] Report, Chief of Engineers, U. S. Army, 1915, p. 3327. [b] Idem, 1914, p. 3143.

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| Section of harbor. | Length of frontage. Along present lines. | Length of frontage. On additional slips. |
|---|---|---|
| Outer harbor: | *Feet.* | *Feet.* |
| City's 147 acres | 4,500 | 10,000 |
| Outer Harbor Dock & Wharf Co. | 7,300 | 4,000 |
| City's 25 acres | 2,800 | 2,000 |
| Municipal Pier No. 1 | 9,000 | 2,600 |
| Total | 23,600 | 18,600 |
| Inner harbor: | | |
| Main channel, west side | 7,900 | 3,600 |
| Main channel, east side | 8,000 | 6,400 |
| Total | 15,900 | 10,000 |
| West Basin: | | |
| Smith's Island | 3,300 | ..... |
| West side | 12,600 | ..... |
| East side | 7,500 | ..... |
| Total | 23,400 | ..... |
| East Basin: | | |
| North side, including Mormon Island and Wilmington Channels | 25,500 | 20,000 |
| Consolidated Lumber Co. Channel | 6,600 | ..... |
| South side | 14,400 | ..... |
| Total | 46,500 | 20,000 |
| Grand total | 109,400 | 48,600 |

All of the frontage in the harbor is either owned or controlled by the city, although a part is privately operated. Under an act of the State legislature approved May 1, 1911, and entitled "An act granting to the City of Los Angeles the tide lands and submerged lands of the State within the boundaries of the said city," the city acquired control of much of this frontage, and it has secured much additional frontage by condemnation and purchase.

**Terminals.**—About 6 miles (31,722 feet) of the available water front have been improved by wharves. The municipal wharves have a total frontage of 9,767 feet and include the following:

| | Feet. | | Feet. |
|---|---|---|---|
| Municipal Pier No. 1 | 2,520 | First Street | 400 |
| East Channel | 400 | Canal Street | 50 |
| Pier A (Mormon Island Wharf) | 2,055 | Ferry Street | 50 |
| Water Street | 670 | Not specified [a] | 2,300 |
| Fish | 840 | | |
| Fries Street | 330 | Total | 9,767 |
| Banning | 152 | | |

Municipal Pier No. 1 consists of a solid fill that is 2,520 feet long and has an area of about 60 acres. Along the western side of this pier Outer Harbor Wharf has been constructed. This wharf, which is 40 feet wide and of reinforced-concrete construction, was built at a cost of $444,777. It has a transit shed 1,800 feet in length, 100 feet wide, and one story in height. The shed is of steel construction and is served by railroad tracks and paved roads. Immediately in the rear of the shed the city is now building the first of a series of fireproof warehouses that will extend through the center of the pier. The first unit will be 460 feet long, 152 feet wide, and six stories in height, and will be of reinforced-concrete construction. In addition, about 5 acres of land on Timms Point, a short distance north of this pier, have been condemned for warehouse purposes.

Pier A, which is located on the northwesterly side of Mormon Island Channel, is 2,055 feet long and 40 feet wide and has a depth of 34 feet at mean lower low water along the southern 1,200 feet. This wharf has been provided with one shed or warehouse 1,000 feet long and another 495 feet long, both of which are 100 feet wide and one story in height. For the privilege of berthing its vessels along

[a] Taken over by the city on July 1, 1915, the franchises given to private corporations having expired June 30.

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the southern 1,200 feet and for the use of the wharf and the larger shed, the American-Hawaiian Steamship Co. guarantees the city a net return of not less than $15,000 a year after the company is allowed 20 per cent of the receipts of the wharf for acting as the agent of the city in its operation.[a]

The Water Street Wharf, which fronts on Wilmington Basin, and has a depth of 30 feet of water alongside, has been improved by a freight shed 530 feet long, 100 feet wide, one story in height, and of timber construction.

The transit shed on Outer Harbor Wharf is of steel construction, while the other sheds are constructed of timber with sides and ends of asbestos-protected sheet metal. All are equipped with automatic-sprinkler systems.

Since July 1, 1915, railroad companies have occupied 8,533 feet of wharf frontage; wharf and dock companies, 7,452 feet; and lumber companies, 6,526 feet. The following is a list of the private wharves, with the frontage of each:

| | Feet. |
|---|---|
| Railroads: | |
| San Pedro, Los Angeles & Salt Lake | 1,903 |
| Southern Pacific | 6,630 |
| Total | 8,533 |
| Wharf and dock companies: | |
| Crescent Wharf & Warehouse Co | 552 |
| Outer Harbor Dock & Wharf Co | 5,400 |
| Pacific Wharf & Storage Co | 1,500 |
| Total | 7,452 |
| Lumber companies: | |
| Consolidated Lumber Co | 1,083 |
| Hammond Lumber Co | 1,000 |
| Kerckhoff-Cuzner Mill & Lumber Co | 1,044 |
| Pacific Lumber Co | 727 |
| San Pedro Lumber Co | 1,550 |
| Southern California Lumber Co | 797 |
| E. K. Wood Lumber Co | 325 |
| Total | 6,526 |

Two companies, the Union Oil Co. and the General Pipe Line Co., have pipe lines to the harbor direct from their respective fields, the Fullerton and the San Joaquin Valleys. The former company has tanks in the eastern side of the harbor and holds a large interest in the stock of the Outer Harbor Dock & Wharf Co. The tanks of the General Pipe Line Co. are located in the outer harbor. This company has a pipe line on the breakwater extending to a depth of 37 feet.

**Type of wharf construction.**—All of the wharves lie parallel to the several channels or are located on slips. There is, strictly speaking, no pier construction, although several wharves are officially designated as piers. One of the city wharves, known as the Outer Harbor Wharf, is of reinforced-concrete construction throughout, while another, the East Channel Wharf, is part concrete. The other city wharves are of creosoted-pile-and-timber construction. One of the private wharves, with a frontage of 2,800 feet, is built on reinforced-concrete piles, and has a timber deck, while the others are of creosoted-pile-and-timber construction.

[a] Port of Los Angeles, handbook issued by Los Angeles Board of Harbor Commissioners, 1913, p. 60.

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**Port administration.**—The port of Los Angeles is under municipal control. The city charter provides for a department of the municipal government to be known as the harbor department. This department is under the management and control of a board of harbor commissioners, consisting of three members who are appointed by the mayor subject to confirmation by the city council.

The harbor commissioners are appointed for terms of four years, one retiring each year. The commissioners receive salaries of $3,000 per year, but are not required to devote their entire time to the work. The board elects one of its number president for one year, during which time he is executive officer of the harbor department.

The city engineer acts as engineer for the board. The board has a permanent secretary and a large staff of employees, who are organized into three divisions as follows:

1. Construction division, which includes the harbor engineer, assistant engineer, draftsmen, inspectors, surveyors, office force, and workmen.
2. Operating division, which consists of the port warden, pilots, boatmen, and wharfinger.
3. Traffic division, which is not yet fully organized. The work relating to traffic is now being performed by the secretary of the board.

The harbor board has, by grant of the city council, the following powers:

1. To make and enforce rules and regulations regarding the use and control of the water front of Los Angeles Harbor and all other navigable waters within the limits of the city.
2. To regulate the operation and use of all water terminals and terminal facilities.
3. To regulate and collect charges for wharfage, dockage, tolls, and cranage for all boats using the terminals controlled or operated by the city; also rates of towage and pilotage, charges on all ferries or other water craft owned or operated by the city, and charges for the use of all warehouses, elevators, and other port facilities owned or operated by the city.

Subject to provisions in ordinances that may from time to time be adopted by the city council, the board of harbor commissioners has charge, superintendence, and control of the following matters:

1. The design, construction, maintenance, and repair of the sea walls, bulkheads, piers, and other facilities of the port.
2. The dredging, deepening, widening, and improvement of the harbor,
3. The ferries, towboats, pilot boats, steamships, etc., owned, operated, or controlled by the city.

The board of harbor commissioners has also a large measure of control over the operation of private docks, wharves, and piers.

The charter requires that all revenues from the port and its facilities shall be deposited in the city treasury in a separate fund, to be known as the "harbor revenue fund," and that no disbursements shall be made out of this fund except for legitimate port requirements.

The powers and duties of the board of harbor commissioners are set forth in considerable detail in Article XVI, sections 168 to 186 of the charter, as amended in 1911. These charter provisions are worthy of study by cities contemplating municipal control and operation of water terminals.

**Port charges**—*Pilotage.*—The board of harbor commissioners employ two pilots, who receive salaries of $2,500 per year. Pilotage is optional in the case of vessels whose masters have pilot's licenses for the port. The charge inward and outward is in each case $1 per foot draft and 1 cent per ton of net register tonnage. Vessels calling at the port to secure fuel, supplies, or orders pay half rates for pilotage. During the fiscal year ended June 30, 1913, pilot fees amounting to $9,238.49 were collected.

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*Towage.*—Towing is done by private firms, usually at rates fixed by contract. Steam tugs charge $25 for assisting a vessel in the outer harbor. Gasoline tugs receive $5 for turning a vessel in the inner harbor and 15 cents per 1,000 feet for towing lumber barges. The secretary of the harbor board states that tugs are seldom required for steamships except for shifting in the harbor.

*Harbor dues.*—Vessels are not required to pay harbor dues.

*Dockage.*—The following are the rates of dockage [a] per day of 24 hours as fixed by ordinance of the city council for the privilege of making fast to any wharf, whether publicly or privately owned:

| Net register tonnage of vessels. | Charges. | Net register tonnage of vessels. | Charges. |
|---|---|---|---|
| Under 10 | None. | 501 to 600 | $8.00 |
| 10 to 50 | (a) | 601 to 700 | 9.00 |
| 51 to 100 | $2.00 | 701 to 800 | 10.00 |
| 101 to 150 | 3.00 | 801 to 1,000 | 11.00 |
| 151 to 200 | 4.00 | 1,001 to 1,200 | 12.00 |
| 201 to 300 | 5.00 | 1,201 to 1,500 | 13.00 |
| 301 to 400 | 6.00 | 1,501 to 1,800 | 14.00 |
| 401 to 500 | 7.00 | 1,801 to 2,100 | 15.00 |

[a] Two cents per net ton per day.

Vessels of more than 2,100 net tons are charged $15 plus one-half cent per ton for each ton above 2,100.

*Wharfage and handling charges.*—The following table contains a list of the principal wharfage and handling charges that are levied at all wharves in Los Angeles Harbor: [b]

| Commodities. | Charges. | | Commodities. | Charges. | |
|---|---|---|---|---|---|
| | Wharfage, per day. | Handling. | | Wharfage, per day. | Handling. |
| GENERAL COMMODITIES. | | | LIVE STOCK—continued. | | |
| Asphalt, cement, lime, plaster, and sand, in packages.....net ton.. | $0.025 | $0.225 | Colts.....each.. | $0.05 | $0.07 |
| General merchandise [c]..do.... | .05 | .30 | Horses and mules.....do.... | .05 | .15 |
| Miscellaneous [d].....do.... | .10 | .60 | Hogs and sheep.....do.... | .005 | .045 |
| Kapok, in bales.....do.... | .10 | .90 | LUMBER AND TIMBER PRODUCTS. | | |
| Barrels, empty.....each.. | .0025 | .0175 | | | |
| Irondrums, empty.....do.... | .0075 | .0325 | Soft woods, 2 by 6 and over, including ties, per 1,000 feet b. m..... | .10 | .50 |
| Merchandise not otherwise specified.....net ton.. | .10 | .3250 | Soft woods, under 2 by 6, and box shooks, shakes, shingles, and lath, in bundles, per 1,000 feet b. m..... | .10 | .65 |
| Roofing paper, in rolls..do.... | .10 | .30 | Hardwoods, 2 by 6 and over, including ties and in bundles, per 1,000 feet b. m..... | .10 | .65 |
| Bananas.....do.... | .10 | .90 | Cedar and hardwood, not otherwise specified, per 1,000 feet b. m..... | .10 | .75 |
| Brick, loose.....do.... | .05 | .35 | Logs.....per 1,000 feet b. m.. | .10 | .65 |
| Brick, crated and boxed, net ton..... | .05 | .30 | Veneers and panels, per net ton..... | .10 | .65 |
| Coal, in bulk.....net ton.. | .05 | .30 | Piles and poles.....per foot.. | .001 | .004 |
| Coke, in bulk.....do.... | .05 | .45 | Cordwood.....per cord.. | .10 | .80 |
| Glass, common window, plate, and sheet.....net ton.. | .05 | .55 | Oil, in bulk.....per barrel.. | .01 | ..... |
| Grain, in bulk.....do.... | .05 | .30 | Rock.....per net ton.. | .025 | .225 |
| Iron, steel, and lead, pig, bar, sheet, angle, scrap, pipes, rails, and structural, .....net ton.. | .10 | .25 | | | |
| LIVE STOCK. | | | | | |
| Calves.....each.. | .03 | .04 | | | |
| Cattle.....do.... | .03 | .10 | | | |

[a] Ordinance No. 32330 (new series), approved June 12, 1915, and ordinance No. 32467 (new series), approved June 12, 1915.

[b] Ordinance No. 32467 (new series), approved June 12, 1915.

[c] Includes flour, salt, nitrate of lime, rice, sugar, iron bolts, nuts, rivets, nails, washers, horseshoes, spikes, staples, grain, bran, mill feed, poultry, food, grits, coffee, peas, beans, potatoes, onions, etc.

[d] Includes cotton, charcoal, coconuts, cork, hair, peanuts, tanbark, wool, empty cases, crates, boxes, etc.

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The foregoing wharfage rates, which apply to the private as well as the public terminals, are for the period of one day. An equal amount is collected for each additional day or part thereof, during which the goods remain on the wharf. Until August 7, 1915, the harbor board had power to fix wharfage and dockage charges at private as well as public terminals and had made both uniform. Since that time the power to fix rates on all privately-owned public utilities, including water terminals, has been vested in the State railroad commission. It is probable, however, that, pending action by the commission, the charges at private wharves will continue at the rates given above.

The manner in which the harbor board determined the proper amount to be charged for wharfage and for handling is described in the annual report of the board for the year ended June 30, 1913, in the following terms:

> Reports were required from all wharf companies, showing their receipts for the preceding year and other data. The commercial wharf companies also submitted a list of wharfage and handling rates which they asked to have established on more than 400 separate items, together with various modifications in the rules, especially relating to handling.
>
> A careful study was made of the entire subject with a view to establishing rates based on the cost of the service plus a reasonable return to the wharf companies. All the information possible was gathered, and numerous conferences were held with shippers, lumbermen, wharf operators, steamship representatives, and others interested.
>
> The long list of items submitted by the wharf operators was finally classified and boiled down to a comparatively small number, and many reductions were made in wharfage and handling charges. These were recommended to the city council for adoption, but steamship representatives objected to the classification on the ground that it would complicate their tariffs in making through rates. The board of harbor commissioners again took up the subject unofficially and finally agreed to a new classification of items as desired by the steamship companies, with such changes in wharfage and handling rates as should maintain the general average agreed upon in the first classification, and the rates were finally enacted in accordance with this compromise.

The city ordinance fixing the wharfage and handling charges that may be collected by the private wharf companies also provides that these companies shall secure an annual license for the privilege of doing business.[a] For the fiscal year ending June 30, 1916, the following fees must be paid by the several companies for the privilege of charging dockage and wharfage:[a]

| | |
|---|---|
| Consolidated Lumber Co | $341.28 |
| Crescent Wharf & Warehouse Co | 415.15 |
| Hammond Lumber Co | 1,513.77 |
| Kerckhoff-Cuzner Mill & Lumber Co | 212.95 |
| Outer Harbor Dock & Wharf Co | 579.58 |
| Pacific Lumber Co | 263.50 |
| Pacific Wharf & Storage Co | 1,065.96 |
| San Pedro, Los Angeles & Salt Lake Railroad Co | 1,758.46 |
| San Pedro Lumber Co | 299.46 |
| Southern California Lumber Co | 388.02 |
| Southern Pacific Co | 3,779.54 |
| E. K. Wood Lumber Co | 721.20 |

[a] Ordinance No. 32467 (new series), approved June 12, 1915.



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## OAKLAND, CAL.

Oakland is located on the east side of San Francisco Bay opposite the city of San Francisco and about 4 miles distant. It is the terminus of several transcontinental railroads and is an important industrial center.

Considering the location of Oakland the development of this harbor has been slow. One reason is that the deposits of silt from the Sacramento and San Joaquin Rivers and the action of the inflowing tides have caused the section of the lower bay opposite Oakland to shoal, "leaving the east shore where Oakland, Berkeley, and Alameda now stand, quite unapproachable in their natural condition by any craft larger than a rowboat, while the shore of San Francisco Peninsula has practicable depth for the largest shipping close to the bank." [a]

The harbor consists of two parts, the outer harbor, which fronts on Oakland Bay, and the inner harbor, which consists of San Antonio Creek, a tidal estuary with a tidal basin at its upper end. The length of the estuary is 4¼ miles and the channel around the tidal basin is 2⅜ miles long. Between the tidal basin and San Leandro Bay a tidal canal 2¼ miles in length has been dug, while a dam has been constructed across the mouth of San Leandro Bay.

The harbor is being improved by the Federal Government under a project that provides for a channel in the estuary 500 feet wide and 30 feet deep, for a channel in the tidal basin 300 feet wide and 30 feet deep, and for a channel 18 feet deep through the tidal canal to San Leandro Bay. The tidal range within the harbor is about 4.5 feet.

The Chief of Engineers, United States Army, reports [b] that the maximum draft that could be carried on June 30, 1914, over the shoalest parts from San Francisco Bay to Peralta Street, Oakland, was 28½ feet.

**Railroads.**—Oakland is served by the Atchison, Topeka & Santa Fe, the Southern Pacific, and the Western Pacific Railroads. The city is also served by the Oakland, Antioch & Eastern Railway, which is an electric line extending to Sacramento, 93 miles distant, and by the San Francisco-Oakland Terminal Railways, which operate a ferry service between Oakland and San Francisco and electric train service, for freight as well as passengers, between Oakland, Piedmont, and Berkeley.

**Steamship lines.**—All of the regular steamship lines entering or operating in San Francisco Bay call at the Port of San Francisco. None calls at Oakland. A considerable number of lumber vessels that are not operated on a regular schedule call at this port.

**Commerce of the port.**—In the calendar year 1914 the water-borne commerce of Oakland consisted of 2,608,402 short tons, valued at $196,114,563. In the year 1913, which was a more normal trade year and is, therefore, preferable for purposes of discussion, the commerce of the port consisted of 3,413,980 short tons, valued at $183,441,743, including 1,198,838 tons of general merchandise, valued at $119,883,800, carried on the ferries plying between San Francisco and Oakland. The volume of the commerce carried otherwise than by

[a] Ports of the Pacific, by Gen. H. M. Chittenden, in Transactions of American Society of Civil Engineers, Vol. LXXVI (1913), p. 167.
[b] Report, Chief of Engineers, U. S. Army, 1914, p. 3153; 1915, p. 3333.

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car ferries was, therefore, 2,215,142 tons and the value, $63,557,943. It should be noted that the estimated valuation for general merchandise in 1913 is only $100 per short ton as compared with $320 per short ton at Los Angeles and San Diego.

The following is a list of the commodities comprising the commerce of the port in the calendar years 1913 and 1914: [a]

| Commodities. | Short tons. | | Value. | |
|---|---|---|---|---|
| | 1913 | 1914 | 1913 | 1914 |
| General merchandise | 1,461,492 | 1,173,610 | $146,149,200 | $149,048,470 |
| Lumber | 945,084 | 756,363 | 11,341,000 | 14,855,580 |
| Machinery, iron, hardware, etc | 81,570 | 4,656 | 8,157,000 | 1,396,800 |
| Potatoes, beans, etc | 145,836 | 25 | 3,645,900 | 750 |
| Live stock | 17,488 | 6 | 2,798,080 | 960 |
| Canned goods | 16,726 | 6,260 | 2,676,228 | 594,700 |
| Fruit | 25,749 | 2,086 | 2,059,920 | 292,040 |
| Crude oil | 278,293 | 193,295 | 1,217,535 | 854,412 |
| Cement | 109,273 | 27,840 | 1,092,730 | 178,400 |
| Groceries | 34,696 | 256 | 693,900 | 51,200 |
| Coal | 79,903 | 42,977 | 639,224 | 137,879 |
| Flour | 8,517 | 1,551 | 493,968 | 89,958 |
| Shingles | 13,997 | 14,208 | 419,888 | 142,080 |
| Paints, oils, etc | 2,439 | 4,921 | 390,240 | 861,175 |
| Sulphur | 6,423 | 10,156 | 321,150 | 253,900 |
| Grain | 8,721 | 1,375 | 313,956 | 48,125 |
| Nitrate, fertilizer, etc | 7,708 | 6,953 | 308,320 | 331,675 |
| Building materials | 151,167 | 88,435 | 302,334 | 176,288 |
| Wines, liquors, etc | 4,594 | 842 | 229,700 | 63,311 |
| Hay | 11,549 | 533 | 150,137 | 9,594 |
| Salt | 2,755 | 3,025 | 41,325 | 15,128 |
| All other | ..... | 269,029 | ..... | 26,709,138 |
| Total | 3,413,980 | 2,608,402 | 183,441,743 | 196,114,563 |

**Extent and ownership of water front.**—The United States Army Engineers estimate that—

The total frontage available for wharves fronting on the channels dredged by the United States, from Peralta Street, Oakland, around the perimeter of the harbor to a point on the Alameda Mole opposite Peralta Street, is about 48,820 feet (opposite Peralta Street the pierhead and bulkhead lines meet and no wharves can be constructed west of that point). Of the available 48,820 feet of frontage, 12,660 feet, or about 25 per cent, is occupied by wharves. The Oakland, or north, side of the harbor is better developed as to water terminals than the south, or Alameda, side, 9,780 feet, or 37 per cent, of the Oakland frontage being occupied by wharves, as against 2,880 feet, or 13 per cent, of the Alameda frontage.[b]

In addition to the frontage on the inner harbor there is about 2 miles of frontage on Oakland Bay in the outer harbor.

The title to much of the water front was the subject of litigation for many years. The following statement, which was prepared by Mr. M. M. Jones, secretary of the Industrial Bureau of the Oakland Chamber of Commerce, contains a brief account of this litigation:

The history of Oakland's water front is most extended and involved an entanglement of legal procedure. It started with the activities of Mr. Horace W. Carpentier, who, as a resident of the village in the early fifties, an attorney, and a member of the State legislature, incorporated the town of Oakland. In the charter of the town the water front of the corporation created was conveyed to the town of Oakland. The town later granted to Mr. Carpentier all the water front lying between high tide and the ship channel in fee, also the exclusive right of constructing wharves, docks, and piers, and collecting wharfage and dockage within the town of Oakland for a period of

[a] Report, Chief of Engineers, U. S. Army, 1914, p. 3153; 1915, p. 3333.
[b] Special Report of Chief of Engineers, U. S. Army, on Water Terminal and Transfer Facilities (H. Doc. No. 226, 63d Cong., 1st sess.), p. 1312.

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37 years. The consideration for this grant was the agreement of Carpentier to construct a schoolhouse, to build a wharf at the foot of what is now Washington Street, to extend the Broadway Wharf, and to pay a certain percentage of the receipts into the town treasury.

Agitation against the town council on account of the grant was commenced almost immediately, and it culminated in several suits which were prosecuted with more or less diligence, but which were never brought to final conclusion upon the merits of the controversy.

In 1868 a compromise was effected under which, in consideration of a deed by Carpentier to the Oakland Water Front Co. of the entire water front, and a deed by the said company of a portion of the property to the Western Pacific Railroad Co. (belonging to the Central Pacific Railroad Co.), the Western Pacific Railroad Co. agreed to build within three years connection between the said property and their main line and to erect on the said property freight and passenger buildings at an expense of not less than $500,000. All the acts of the trustees of the town in granting the property were confirmed, and the water front released to Carpentier and his assigns forever.

In the early nineties the city of Oakland brought suit against the Oakland Water Front Co., the successor in interest of Carpentier, for the purpose of annulling the grant to Carpentier. The suit was decided in the superior court of Alameda County in favor of the city, and the water-front company appealed and the judgment was reversed. In the decision in that case, which is reported in 118 California, 160, it was decided that the original grant to Carpentier was void, but that by virtue of the compromise of 1868 the title of Carpentier and the Oakland Water Front Co. to the land between high tide and ship channel had become absolute. In that case the supreme court further decided, contrary to the contentions of both litigants, that the ship channel was not the 3-fathom line but was the line of ordinary low tide as it existed on May 4, 1852. This resulted in a very considerable limitation of the area of the grant to Carpentier.

This case left undecided and without consideration the question as to the status of the land lying waterward of the low-tide line of 1852, which had been for many years in possession of Carpentier and his grantees, including the Oakland Water Front Co. and the Southern Pacific Railroad Co.

It remained for a private corporation to bring to a head the litigation that opened the way for the successful assertion by the city of Oakland of a claim to the portion of the water front lying waterward of the low-tide line as it existed on May 4, 1852. This private corporation was the Western Pacific Railway Co. Early in 1906 this company received from the city of Oakland a franchise purporting to give it the right to occupy a strip of land on the western water front. It went into possession, whereupon the Southern Pacific Railroad Co. brought suit in the United States district court, and the Western Pacific Railway Co. filed a cross complaint, with the resulting decision in favor of the Southern Pacific Railroad Co. The Western Pacific Railway Co. appealed to the circuit court of the United States, which reversed the decision of the district court, and the case was decided in favor of the Western Pacific Railway Co.

The task of locating the low-tide line with accuracy was one which was almost impossible of attainment in a judicial proceeding and was not undertaken until 1911 in a case pending on appeal wherein the city was victorious in the superior court of this county. For that reason the city of Oakland took upon themselves the task of settling the boundary line with various parties at interest, and as a result it secured extremely favorable settlements with different parties and secured quitclaim deeds to a large amount of property in consideration of the franchise for its use for from 25 to 50 years by the parties now in possession.

The grant of 1911 and various other grants from the State made between 1852 and that time covered specific portions of the water front, and were more in the nature of caring for the expansion of the city than for anything else. The grant of 1911 more especially applied to the western water front where the various railroad piers are located. Under these grants franchises were then issued to the various railroad companies for 50 years, after which time the property vests absolutely in the city of Oakland, together with improvements thereon.

It will thus be seen that while the title to practically all of the water front is now firmly established in the name of the city, it has been leased in a great many instances to private concerns, with the idea not only of settling these old controversies but also of contributing to the industrial development of the community. Immediately after the proceedings were decided favorably to the city the improvements were started, and the sum of $2,503,000 has been expended in providing for the first unit of the municipal facilities and in laying the foundation for other developments to follow.

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**Terminals.**—The principal terminals in the outer harbor are those used by the Southern Pacific, the Western Pacific, and the San Francisco and Oakland Terminal Railroads, the most extensive terminals being those of the Southern Pacific Co.

The Southern Pacific Co. owns or controls the following properties fronting on Oakland Bay:

1. Alameda Pier, which has a large passenger shed and is used as a passenger-ferry slip and commercial wharf. The slip is 11,600 feet from the shore and is reached by an approach from 200 to 700 feet in width. This pier is used extensively for suburban passenger traffic.
2. Oakland Pier, which consists of a solid fill 5,000 feet long and 100 feet wide and has two ferry-transfer slips, one being used for freight-car ferries and car floats and the other largely for passenger-ferry steamers. This pier has a large passenger-ferry shed and is extensively used for both through and suburban passenger traffic.
3. Oakland Long Wharf, or Mole, which consists of a number of wharves located more than half a mile from the shore and reached by a trestle 2,535 feet in length and by various approaches. The several wharves have the following dimensions: Wharf No. 1, 450 feet long, 50 feet wide; wharf No. 2, 400 feet long, 60 feet wide; wharf No. 3, 500 feet long, 100 feet wide; wharf No. 4, 700 feet long, 90 feet wide; wharf No. 5, 1,000 feet long, 70 to 150 feet wide.

The Western Pacific Railway Co. has one terminal on the Oakland Bay Front at the entrance to the estuary. This is used as a passenger-ferry slip and also for freight and is reached by an approach consisting of a solid fill 8,100 feet long and from 50 to 1,000 feet wide and a trestle 650 feet long and 90 feet wide.

The San Francisco and Oakland Terminal Railways own the Key System Pier, which is 880 feet long and 160 feet wide and is reached by an open-pile trestle approach 13,765 feet long and 30 feet wide.

Between the Key System Pier and the Oakland Mole terminals of the Southern Pacific Co. the city of Oakland has constructed a retaining wall and will build three wharves and a pier.

In the inner harbor there were, in 1913, 52 terminals, most of which were used by lumber, stone, sand, building supplies, oil, and industrial companies. Many of these are small, poorly constructed, and comparatively little used. Sixteen terminals are owned by the city of Oakland, one by the Atchison, Topeka & Santa Fe Railway Co., three by the Southern Pacific Co., and five by the Oakland Water Front Co.[a]

The terminals owned by the city of Oakland include the following:

1. Frederick Street Wharf, which is 680 feet long and from 130 feet to 190 feet wide. This wharf is leased to the E. K. Wood Lumber Co., and is equipped with a 5-ton traveling crane.
2. Wharf between Frederick and Dennison Streets, which is 60 feet long and 40 feet wide and is reached by a trestle 160 feet long and 30 feet wide. This wharf is leased to the Standard Gas Engine Co.,
3. Livingston Street Wharf, which is 293 feet long and 124 feet wide, and is open to public use.
4. Twenty-first Avenue Wharf, which is 60 feet long and 60 feet wide and has an approach 250 feet long and 20 feet wide. This wharf is used by the Atlas Gas Engine Co.
5. Wharf between Eighteenth and Nineteenth Avenues, which is 650 feet long and from 40 to 110 feet in width and is reached by an approach 52 feet wide and 225 feet long. This wharf is leased to the Hodge & Collins Lumber Co.
6. Fourteenth Avenue Wharf, which is 120 feet long and 70 feet wide has an approach 225 feet long and 30 feet wide. This wharf is leased to the Larue Wharf & Dock Co.

[a] Special Report of Chief of Engineers, U. S. Army, on Water Terminal and Transfer Facilities (H. Doc. No. 226, 63d Cong., 1st sess.), pp. 1315–1325.

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7. Wharf between Tenth and Eleventh Avenues, which is 190 feet long and 170 feet wide and is leased to the American Dredging Co.

8. Webster Street Wharf, which is 300 feet long and 60 feet wide and has a frame warehouse with floor space of 13,440 square feet. This terminal is leased to the California Transportation Co. and is used by the river boats operated by this company.

9. Franklin Street Wharf, which is 290 feet long and 70 feet wide and has a warehouse with an area of 10,000 square feet. This wharf is open to the public although it is used chiefly by the Oakland Launch & Tugboat Co.

10. Franklin Street Wharf, which is 275 feet long and 42 feet wide. This wharf is equipped with two electric-conveyor cranes that handle coal buckets of one-half cubic yard capacity.

11. Broadway Wharf, which is 300 feet long and from 160 to 178 feet wide. This wharf is leased to the Pacific Fuel & Building Material Co.

12. Garbage Disposal Wharf, which is 180 feet long and 110 feet wide.

13. Washington Street Wharf, which is 360 feet long and from 100 to 150 feet wide, and is reached by an approach 300 feet long and 20 feet wide. This wharf has a frame warehouse with 19,690 square feet of floor space and is leased to the Bay Cities Transportation Co. as a landing place for river and bay boats.

14. Clay Street Wharf, which is 100 feet long and from 100 to 150 feet wide and has an approach 300 feet in length and 20 feet in width. This wharf is open to public use.

15. Clay Street Wharf, which is 100 feet long and 90 feet wide. This wharf also is open to public use.

16. Kendall Street Wharf, which is from 100 to 390 feet long and 50 feet wide and is open to public use.

17. Oakland Terminal. This is the new quay wall recently constructed by the city of Oakland. This wharf is 1,948 feet long and 150 feet wide. It has one shed 404 feet long and 90 feet wide and is connected by a spur track with the rails of the Southern Pacific Co.

The Clay Street and Kendall Street Wharves were to be torn out in May, 1913, and the area dredged to a depth of 30 feet.

The municipal wharves at Frederick Street, Twenty-first and Fourteenth Avenues, and those between Eighteenth and Nineteenth Avenues, and between Tenth and Eleventh Avenues are leased for terms of 25 to 50 years at an annual rental of 25 cents per linear foot. The Franklin Street Wharf is leased at a rental of $100 per month in addition to tolls and dockage while the Clay Street Wharf is leased to two concerns at a monthly rental for each of $50 in addition to tolls and dockage.

The Atchison, Topeka & Santa Fe Railway Co. owns a wharf which is located between Alice and Fallon Streets. This wharf is 1,500 feet long and from 50 to 100 feet wide and is leased to the Oakland Dock & Warehouse Co., a subsidiary organization. This wharf has three warehouses, two being of frame construction and one of galvanized iron. The one of galvanized iron is two stories in height. The total floor space is about 37,000 square feet.

The inner harbor terminals of the Southern Pacific Co. include:

1. Broadway Street Slip, which is 350 feet long and 40 feet wide and has a small warehouse and a ferry slip used by the ferryboats on the Creek route of the Southern Pacific system.

2. Peralta Street Slip, which is also a car-ferry slip and is 700 feet long and 145 feet wide, with wings 400 and 450 feet in length. This is the main transfer point for freight in cars by car ferry between San Francisco and the main line of the Southern Pacific Co.

3. Peralta Street Wharf, which is 500 feet long and 70 feet wide and is used only as a docking place for vessels of the Southern Pacific Co. undergoing repairs.

The Oakland Water Front Co., which is believed to be affiliated with the Southern Pacific Co., owns five terminals which are leased to various corporations. None of these terminals is extensive or important from a commercial standpoint.

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**Type of wharf construction.**—In order to reach deep water many of the wharves have been located at a considerable distance from the mainland and are reached by means of trestles or approaches. The great majority of the wharves and the approaches are of pile-and-timber construction. One wharf, known as Howard's sea wall, consists of a filled-concrete bulkhead. The Key System Pier in the outer harbor is built on concrete cylinders instead of timber piles. One municipal wharf, that between Dennison and Frederick Streets, is constructed on piles encased in concrete and has a timber deck, while another, the Livingston Street Wharf, is built on piles of solid concrete and has a reinforced-concrete deck, or floor, covered with asphalt.

**Port administration.**—Oakland was the first city in California to be entrusted by the State with the control of its water front. In 1852 the legislature ceded the water front to the city, which granted the more important sections to various private interests. The city has only recently recovered title to much of this property after long years of litigation. An account of this litigation is given above on pages 275 and 276.

Harbor affairs are at present administered by the commissioner of public works, in whose department a new division has recently been created which is entrusted with the supervision of the work on the new wharves and the management of the old municipal wharves. At the head of this division is a harbor manager who is appointed by the city council.

**Port charges.**—Pilotage, towage, dockage, and wharfage charges are the same as at the port of San Francisco.

## PORT SAN LUIS, CAL.

This port is unique among those included in the present report for the reason that it is remote from any center of population. Port San Luis had at the census of 1910 only 33 inhabitants while the nearest town of importance, which is San Luis Obispo, had only 5,157. It is unique also in the fact that almost the entire commerce of the port consists of shipments of crude oil.

Port San Luis, or San Luis Obispo Harbor, owes its importance to its proximity to the extensive oil fields that have been developed in recent years in central California. The harbor is about 9 miles to the south and west of the town of San Luis Obispo, 248 nautical miles south of San Francisco, and 204 nautical miles north of Los Angeles Harbor. It is a bight of the coast and is protected to a large degree by the construction of a breakwater and by Whaler Reef. The available depths of water in the protected area vary from 20 to 33 feet at mean lower low water while the mean range of tide is 4.6 feet.[a]

**Railroads.**—The harbor proper is served by one railroad, the Pacific Coast Railway Co., which operates only 76 miles of road and connects with the Southern Pacific at the town of San Luis Obispo.

The port is connected with the oil fields by means of the following pipe lines:

The 8-inch pipe line of the Standard Oil Co., from the Santa Maria field, Santa Barbara County, 35 miles long; the 8-inch and 6-inch pipe lines of the Union Oil Co., from the same field; and the 8-inch and 6-inch pipe lines of the Producers' Transportation

[a] Report, Chief of Engineers, U. S. Army, 1914, pp. 1317-1318.

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Co., which are 120 miles in length and extend from Coalinga and other fields in the San Joaquin Valley.

**Steamship lines.**—There are no regular lines of steamships that call at this port. The principal vessels are those engaged in the oil-carrying trade. It is reported that the regular oil fleet of the port consists of 23 vessels and barges, about half of which have an individual capacity of 50,000 barrels.[a]

**Commerce of the port.**—The water-borne commerce of Port San Luis in the calendar year 1914 consisted of 2,280,319 short tons, valued at $10,355,955. In the year 1913, which was a more nearly normal trade year and is therefore preferable for purposes of discussion, it amounted to 2,137,187 short tons, the value being $8,865,418. Shipments of crude oil amounted to 13,007,638 barrels, or 2,118,507 short tons, valued at $7,804,583. A number of other commodities entered into the trade of the port, the most important being general merchandise valued at $802,880.[a]

**Extent and ownership of water front.**—A water front of several miles is available within the section of the protected area that is sufficiently free from storms to provide safe mooring.

**Terminals.**—There are three wharves, the Port San Luis, or oil, Wharf, the county wharf, and a new commercial wharf.

The oil wharf is owned by the Pacific Coast Railway Co. It is situated in the middle of the area protected by the breakwater and has the following pipe-line connections with the lines extending from the several oil fields: Five 10-inch, one 8-inch, five 6-inch, and one 4-inch. This wharf is used also by vessels carrying lumber, grain, and general merchandise.

The county pier, which was constructed in 1907 by San Luis Obispo County, is on the extreme end of the protected area and terminates in about 26 feet of water. Formerly this pier was exposed to storms and swells. It is used chiefly for the lumber trade. The commercial wharf was constructed in 1914.

**Type of wharf construction.**—The wharves consist of long piers, this form of construction being necessary to reach deep water. The piers are built on creosoted piles and have timber decks.

**Port administration.**—No public official is charged with the duty of administering port affairs.

**Port charges.**—Because of the special character of the commerce of the port, the subject of port charges is of little importance.

## PORTLAND, OREG.

Portland is the only river harbor of importance on the Pacific coast. It is situated at the head of deep-water navigation on the Willamette River, 12 miles above its confluence with the Columbia River and 112 miles distant from the Pacific Ocean.

Portland occupies an excellent strategic position from a commercial standpoint. The Columbia is not only the most important river on the Pacific coast but, with its tributaries, forms the only natural low-grade highway through the Sierra and Cascade Mountain Ranges. The main valley of the river extends back from the sea for a distance of 75 miles where its tributaries begin to spread out like an enormous

[a] Report, Chief of Engineers, U. S. Army, 1914, p. 3145; idem, 1915, p. 3328.

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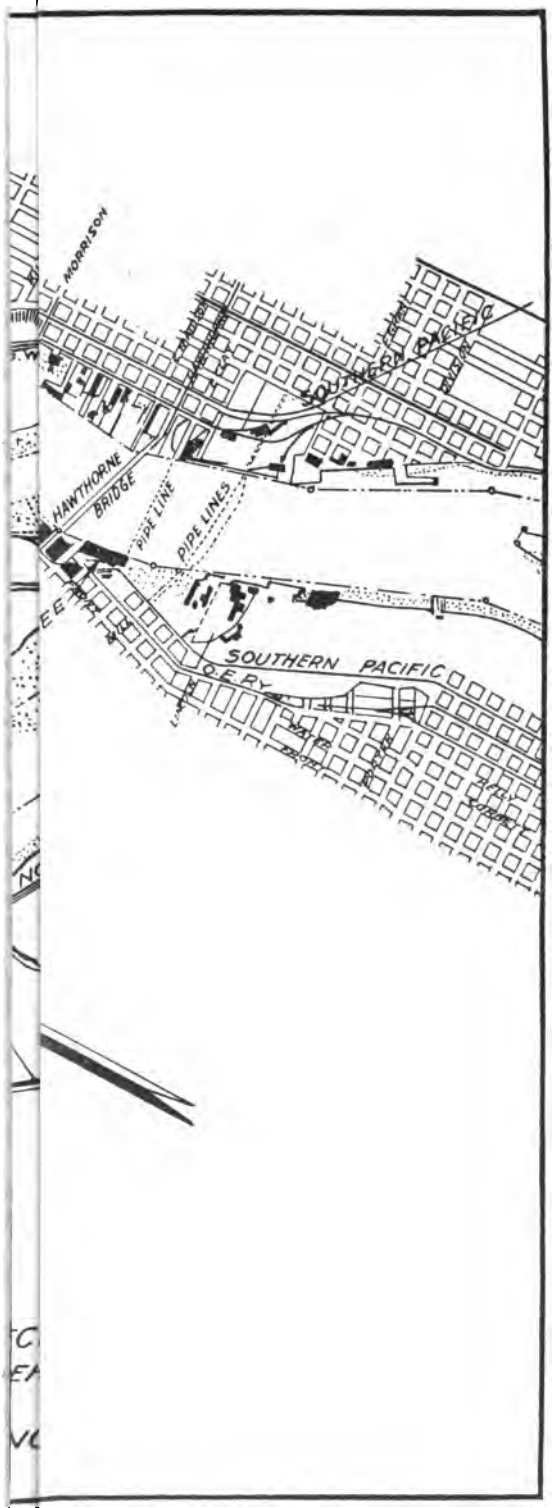


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fan, affording highways for a vast territory beyond the Continental Divide.

The Columbia has a minimum low-water depth of about 28 feet from the bar at the ocean to its confluence with the Willamette and of 8 feet from that point to the Celilo Canal. The canal was completed in May, 1915, and another stretch of river, a distance of 191 miles between the canal and Priest Rapids, opened to navigation with a minimum low-water depth of 4½ feet.

One of the important tributaries of the Columbia is the Snake River, which flows into the main stream 124 miles above Celilo Canal and is navigable for a distance of 146 miles above the canal during the greater portion of the year and for 70 miles above the canal during certain periods.

The Willamette has at present a minimum low-water depth of 28 feet from its confluence with the Columbia to the wharves at Portland and is navigable for 171 miles above Portland during favorable stages of water and, at nearly all stages, for a distance of 83 miles above.

The chief difficulties that have been experienced by Portland and Columbia River commerce in the past were the bar, at the mouth of the Columbia River, and the river between the sea and Portland. Thirty years ago a project was outlined for improvement at the mouth of the Columbia. This work is probably the most difficult port-engineering work that has yet been undertaken on the Pacific coast and it has also proven very costly, the total expenditures amounting to about $11,000,000. The original plan evolved by the engineers, although somewhat slow in accomplishment, has been steadily pursued, and definite progress has been made until now the full depth of water on the bar contemplated by the engineers seems to be assured within another year.

Another drawback lies in the fact that the rivers are subject to annual freshets or floods which cause fluctuations, at times, of more than 30 feet. The port is so far inland, however, that there is practically no tidal fluctuation, although at the entrance to the Columbia River the tidal range is about 7½ feet.

The improvement of the channel from the bar to the city of Portland has been made jointly by the Federal Government and the port of Portland.

**Railroads.**—Portland is served directly by the Great Northern, the Northern Pacific, the Oregon-Washington Railroad & Navigation, the Southern Pacific, and the Spokane, Portland & Seattle Railroads. The city is also served through indirect connection by the Chicago, Burlington & Quincy and the Union Pacific Railroads.

The port has no complete marginal railway or belt line but the service of such a connection is largely performed by the Northern Pacific Terminal Co., which has one or more tracks in Front Street.

**Steamship lines.**—The following is a list of the principal coastwise or coast-to-coast lines of steamships that call at this port:

American-Hawaiian Steamship Co., which operates, on the average, one boat per. week in each direction between Portland, New York, and several intermediate points.

Arrow Line, which operates one boat weekly in each direction between Portland and San Francisco.

Atlantic & Pacific Steamship Co., which operates one boat monthly in each direction between Portland and New York via the Panama Canal.

Dodge Steamship Co., which operates two and sometimes three boats weekly in each direction between Portland and San Francisco.

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Great Northern Pacific Steamship Co., which operates one boat every four days in each direction between Portland, Astoria, and San Francisco.

Northern Pacific Steamship Co., which operates one boat weekly in each direction between Portland, San Francisco, Santa Barbara, Los Angeles, and San Diego, and one boat every five days in each direction between Portland, Coos Bay, Eureka, and San Francisco.

Portland & Coos Bay Steamship Line, which operates one boat weekly in each direction between Portland and Coos Bay.

San Francisco & Portland Steamship Co., which operates one boat every five days in each direction between Portland, Astoria, San Francisco, and Los Angeles.

The only important trans-Pacific line that calls regularly at Portland is the Royal Mail Steam Packet Co., which maintains a freight service of four steamers per week from Portland, Tacoma, Seattle, and Vancouver to Japan, China, Manila, the Straits Settlements, India, and Europe. Prior to the war in Europe the Hamburg-American Line maintained a regular monthly service between Portland and Yokohama, Kobe, Shanghai, Hongkong, Manila, and Singapore. A number of lines operating between Pacific coast ports and Europe call, on the average, about once a month at this port. This number includes the East Asiatic Co. (Ltd.), the Harrison Direct Line, and the Johnson Line.

There are several lines operating regularly on the Willamette and Columbia Rivers, among which are the following:

Dalles-Columbia Line, which maintains a schedule of eight sailings weekly in each direction between Portland, Vancouver, Cascade Locks, and The Dalles, a distance of 115 miles; two steamers every fifth day to upper Columbia, Kennewick, and Priest Rapids; and daily between Kennewick, Washington, and Lewiston, Idaho.

Dalles, Portland & Astoria Navigation Co., which operates two steamers on alternate days between Portland and The Dalles.

Peoples Navigation Co., which operates one steamer every other day between Portland and The Dalles.

Harkins Transportation Co., which operates one boat daily between Portland and Astoria.

Oregon-Washington Railroad & Navigation Co., which operates one boat daily (except Sunday) between Portland, Astoria, and intermediate points.

Oregon City Transportation Co., which operates two steamers on alternate days, between Willamette River points.

**Commerce of the port.**—The water-borne commerce of the port of Portland in the calendar year 1913 amounted to 7,923,902 short tons, valued at $102,058,764,[a] and in 1914 to 8,043,263 short tons valued at $100,018,293, as indicated in the following table:

| Class. | Short tons. | | Value. | |
|---|---|---|---|---|
| | 1913 | 1914 | 1913 | 1914 |
| Foreign | 722,667 | 742,858 | $18,082,234 | $16,305,948 |
| Coastwise | 2,366,551 | 1,976,222 | 48,516,958 | 51,736,090 |
| Local river | 4,834,684 | 5,324,183 | 35,459,572 | 31,976,255 |
| Total | 7,923,902 | 8,043,263 | 102,058,764 | 100,018,293 |

It will be noted that the local river traffic is the most important portion and constituted more than three-fifths of the total tonnage of the port. An examination of the following tabulation of the local

[a] Report, Chief of Engineers, U. S. Army, 1914, pp. 3229-3230; idem, 1915, p. 3404.

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river traffic shows, however, that the greater part of the tonnage consisted of logs, sand and gravel, oil, and stone:

| Commodities. | 1913 | | 1914 | |
|---|---|---|---|---|
| | Short tons. | Value. | Short tons. | Value. |
| Logs (towed) | 2,472,050 | $12,360,250 | 1,967,054 | $7,868,216 |
| Sand and gravel (barged) | 826,071 | 413,036 | 306,508 | 153,254 |
| Oil (barged) | 539,489 | 4,046,168 | 289,743 | 1,477,689 |
| Stone (barged) | 493,974 | 296,384 | 2,373,878 | 1,186,939 |
| Lumber | 94,116 | 658,812 | 20,103 | 160,824 |
| Paper and pulp | 86,991 | 2,348,757 | 63,830 | 2,851,453 |
| Piles (towed) | 76,510 | 229,530 | 86,200 | 275,840 |
| Merchandise | 66,684 | 6,668,400 | 46,113 | 4,611,300 |
| "Miscellaneous" | 33,160 | 1,989,600 | 14,973 | 598,920 |
| Wood (barged) | 26,369 | 39,554 | 41,956 | 52,445 |
| Shingles | 19,705 | 354,690 | 23,887 | 477,740 |
| Potatoes | 17,126 | 342,520 | 12,331 | 345,268 |
| Fish | 12,611 | 1,513,320 | 7,318 | 878,160 |
| Grain | 10,499 | 283,473 | 654 | 20,928 |
| Manufactured iron and steel | 9,790 | 293,700 | 5,863 | 234,520 |
| All other | 49,539 | 3,621,378 | 63,772 | 10,782,759 |
| Total | 4,834,684 | 35,459,572 | 5,324,183 | 31,976,255 |

The principal commodities in the coastwise (domestic) trade of this port, as shown by the records of the Merchants' Exchange Association of Portland, are indicated in the following table:

| Commodities. | 1913 | | 1914 | |
|---|---|---|---|---|
| | Short tons. | Value. | Short tons. | Value. |
| "Merchandise" | 106,305 | $10,630,500 | 140,225 | $14,022,500 |
| Oil, fuel, etc | 982,000 | 7,365,000 | 698,657 | 4,890,599 |
| Wheat | 214,230 | 6,194,889 | 151,119 | 4,382,451 |
| Lumber | 566,441 | 3,965,087 | 572,950 | 4,583,600 |
| Sugar | 29,484 | 3,243,240 | 31,018 | 3,411,980 |
| Hardware | 29,747 | 2,974,700 | 33,378 | 3,337,800 |
| Flour | 43,178 | 1,943,010 | 49,022 | 2,696,210 |
| Cement | 122,499 | 1,224,990 | 56,253 | 562,530 |
| Paper | 17,769 | 1,154,985 | 18,987 | 1,272,129 |
| Canned goods | 7,347 | 918,375 | 6,971 | 871,375 |
| Tobacco | 742 | 742,000 | 1,218 | 1,218,000 |
| Salmon, canned | 2,691 | 538,200 | 9,681 | 1,936,200 |
| Coffee | 1,054 | 521,141 | 2,700 | 1,333,800 |
| Barley | 20,362 | 515,072 | 1,039 | 25,975 |
| All other | 222,702 | 6,585,769 | 203,004 | 7,190,941 |
| Total | 2,366,551 | 48,516,958 | 1,976,222 | 51,736,090 |

The foreign trade of the port is indicated in the following table:

| Commodities. | 1913 | | 1914 | |
|---|---|---|---|---|
| | Short tons. | Value. | Short tons. | Value. |
| Wheat | 253,891 | $7,232,311 | 230,720 | $8,083,721 |
| Flour | 78,562 | 3,071,695 | 42,425 | 1,775,173 |
| Lumber | 302,337 | 2,531,449 | 363,112 | 2,178,670 |
| Miscellaneous | 8,102 | 2,430,597 | ..... | ..... |
| Barley | 50,209 | 1,379,203 | 52,293 | 1,331,079 |
| Bags and burlap | 5,033 | 889,648 | 8,975 | 1,433,321 |
| Fiber | 601 | 123,861 | 1,380 | 235,793 |
| Rice | 1,770 | 105,596 | 1,868 | 110,613 |
| All other | 22,162 | 317,874 | 42,085 | 1,157,578 |
| Total | 722,667 | 18,082,234 | 742,858 | 16,305,948 |

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**Extent and ownership of the water front.**—The harbor at Portland lies on both sides of the Willamette River, which divides the city into two sections. On the west bank of the river the main business district, the principal industries and the railroad stations and terminals are located. The section on the east bank is more residential in character but contains also a number of lumber and flour mills, grain elevators, and various industrial plants. A map indicating the principal terminals at this port is shown opposite page 280.

Within the present limits of the city approximately 22 miles of water front are available for deep-water navigation. Including the frontage on the Willamette below the lower limits of the city, about 25 miles of frontage are available.

The city of Portland owns a frontage of about one-half mile, which it has acquired at great cost. An attempt was made to have the State of Oregon convey to the city of Portland its title to the submerged lands of the Willamette River along the harbor front of the city between the harbor line and the ordinary high-water mark. A bill providing for such a grant was defeated by the State legislature in 1913. The commission of public docks then undertook to establish the right of the city to build municipal docks on submerged lands of the State without compensation to the upland owners, but in a test case the supreme court of the State decided against the city.

Transportation companies, the city of Portland, and private parties own and occupy about 5 miles of improved water front. The United States Army Engineers estimated that in 1913 the river frontage used for water terminals was about 24,200 feet, of which over 17,000 feet were used by both ocean and river steamers and about 7,000 feet exclusively by river boats.[a]

**Terminals.**—Prior to 1913 the city of Portland owned no improved river frontage. In that year, however, the first public terminal was completed. It is a combined moter-boat landing and recreation wharf and is located on the west side of the river at the foot of Stark Street. The wharf is of concrete construction and is provided with two large waiting and recreation rooms. A footbridge or stairs leads from the street entrance to the barge float, the latter being used as a landing stage.

Municipal Dock No. 1, which was completed in the early part of 1915, is also located on the west side of the river. The dock consists of a wharf parallel to the stream and is 955 feet long and 122 feet wide between the concrete wall along the shore and the outer side. The wharf is of pile-and-timber construction with ends of concrete.

Because of the marked rise in the river during freshets, it is necessary to build the wharves at two levels if they are to be used at all stages of water. Municipal Dock No. 1 has, therefore, been constructed on the two-level plan, the floors being 18 and 32 feet, respectively, above low water. The larger part of the wharf, a section 655 feet in length, has only one level, this level being 32 feet, while the remainder has two levels, one at 32 feet and the other at 14 feet.

[a] Special Report of Chief of Engineers, U. S. Army, on Water Terminal and Transfer Facilities (H. Doc. No. 226, 63d Cong., 1st sess.), p. 1464.

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A slip 120 feet wide, 484 feet long, and 30 feet deep has been constructed at the north end of Dock No. 1. The southern side of the slip is used as an open wharf, which is 60 feet wide. Adjoining this wharf is a transit shed 330 feet long and 176 feet wide, which is equipped with cargo masts. There are two railroad tracks on the open wharf in front of the transit shed and two also in the rear of the shed.

Dock No. 1 is provided with a wharf shed 955 feet long and 100 feet wide. As indicated above, this shed has two sections, one of which is 655 feet long and one story high while the other is 300 feet long and two stories in height. This warehouse is of heavy mill construction with fire and end walls of concrete and is equipped with a sprinkler system. The sides of the warehouse are protected with asbestos and metal sheathing.

Dock No. 1 is served by two railroad tracks, which are located in the rear of the warehouse. The handling equipment consists of one 3-ton elevator in the two-level section, in addition to one 20-ton locomotive crane, two 2-ton electric trucks, and cargo masts. These masts may be used with ship's gear alone, or with ship's gear and electric-dock winches, of which four have been installed.

It was planned originally to construct a five-story reinforced-concrete warehouse in the rear of Dock No. 1, but this plan has been given up. Instead a one-story warehouse of heavy mill construction has been erected. This warehouse has a floor area of about 38,000 square feet, is connected with the wharf or transit shed by means of an overhead conveyor electrically operated, and has rail connections on two sides.

Municipal Dock No. 2 is located on the east side of the river about 3,000 feet above Dock No. 1, and directly opposite the municipal boat landing. This dock, which was completed in 1915, is 526 feet long and 122 feet wide. It is a two-level structure throughout, the covered portion being 100 feet wide. The transit shed is of about the same construction as that of Dock No. 1, the principal difference being that the lower floor at Dock No. 2 consists of reinforced-concrete slabs resting on creosoted timbers instead of a wood floor.

Dock No. 2 is equipped with two 3-ton elevators with a platform 8 feet wide and 14 feet long and is provided with two parallel tracks in the rear, which serve both levels of the dock shed.

The city of Portland also owns a portion of the public levee on the west side of the river. This property reverted to the State of Oregon as a result of an act passed during the 1913 session of the legislature and was later transferred to the city of Portland. A portion of the property was then leased to the Southern Pacific Co. for a term of 25 years, and the remainder, which is 640 feet long (including street ends) and has an average width of about 120 feet, has been retained by the city for future terminal development.

By the annexation on July 1, 1915, of the town of St. Johns, the city of Portland acquired the St. Johns Public Dock, which is now designated as Municipal Dock No. 3. This wharf is 550 feet long, and has one level for a distance of 500 feet and two levels extending only 50 feet. The transit shed on this wharf is one story high, 440 feet long, and 100 feet wide.

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Municipal Docks Nos. 1 and 2 have, as stated above, ample railroad connections, but Dock No. 3 has none at present.

Among the public terminal facilities at the port, mention should be made of the floating dry dock maintained by the Port of Portland Commission. This dry dock is 468 feet long, 82 feet wide at the entrance, and has a depth of 25 feet over the sills, with a dead-weight lifting capacity of 10,000 tons.

The following is a list of the principal privately-owned wharves in Portland, with the dimensions of each wharf and wharf shed:

| Names of wharves. | Wharves. | | | Wharf sheds. | | | Class of commodities handled. | Railroad connection. |
|---|---|---|---|---|---|---|---|---|
| | Length. | Width. | Levels. | Length. | Width. | Stories. | | |
| | *Feet.* | *Feet.* | | *Feet.* | *Feet.* | | | |
| Oregon-Washington Railroad & Navigation Co., Ainsworth Docks. | 692 | 135 | [a] 2 | 596 | 96 | 1 | General cargo | Yes. |
| | 298 | 110 | 1 | 298 | 81 | 1 | do | Yes. |
| Albina Dock | 570 | 138 | 1 | 516 | 119 | 1 | Grain | Yes. |
| Oregon-Washington Dock. | 580 | 142 | 1 | 560 | 120 | 1 | do | Yes. |
| Spokane, Portland & Seattle Railway, North Bank Dock. | 1,000 | 181 | [b] 2 | 900 | 169 | 1 | do | Yes. |
| Albers Bros. Milling Co.: | | | | | | | | |
| Dock No. 1 | 309 | 161 | [c] 2 | 309 | 154 | 1 | General cargo | Yes. |
| Dock No. 2 | 178 | 132 | [a] 2 | 178 | 122 | 2 | do | Yes. |
| Dock No. 3 | 300 | 220 | [d] 2 | 278 | 200 | 1 | do | Yes. |
| Columbia Dock No. 1 | 300 | 225 | [d] 2 | 300 | 218 | 1 | do | Yes. |
| Couch Street Dock | 260 | 145 | [a] 2 | 260 | 89 | 1 | do | [e] No. |
| Oak Street Dock | 200 | 98 | [a] 2 | 200 | 89 | 1 | do | [e] No. |
| Irving Dock | 405 | 250 | 1 | 405 | 240 | 1 | Grain | Yes. |
| Oregon & California Grain & Elevator Co. | 380 | 150 | [a] 2 | 315 | 136 | 1 | do | [f] Yes. |
| Montgomery Dock No. 2. | 570 | 270 | 1 | 545 | 260 | 1 | do | Yes. |
| Pacific Coast Elevator Co. | 565 | 114 | 1 | 560 | 103 | 1 | do | Yes. |
| Portland Flouring Mills Co. | 512 | 102 | [a] 2 | 481 | 90 | 1 | do | Yes. |
| Mersey Dock | 300 | 235 | [c] 2 | 300 | 218 | 1 | do | Yes. |
| Crown Dock | 300 | 100 | [a] 2 | 300 | 90 | 1 | do | Yes. |

[a] Throughout.
[b] All except 100 feet has two levels.
[c] Only in part.
[d] For about one-half its length.
[e] Railroad tracks are in marginal street about 100 feet back from wharf.
[f] Grain elevator 280,000 bushels capacity.

The Albina Dock of the Oregon-Washington Railroad & Navigation Co. is equipped with an electric conveyor. Adjoining the warehouse the dock is open for a space 80 feet wide and 140 feet deep. This part of the dock is equipped with an electric crane capable of handling 35 tons from boat to car or wharf and an inclined track capable of handling from three to six cars according to the stage of the river. The cars are generally placed on the inclined track in such a manner as to bring the deck of the boat on a level with the floor of the car, so that the freight can easily be transferred by a derrick or boom on the boat.

Three grain wharves, having a total length of 1,720 feet, with an average width of transit shed of approximately 190 feet, were destroyed by fire during the year 1914, while one large grain wharf was torn down to make room for Municipal Dock No. 1.

In addition to the wharves described above, there are a number occupied by sawmills which are used solely for handling logs and lum-

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ber. These are all open wharves and their total length is 3,755 feet. A number of small docks, of which no mention has yet been made, are occupied by river boats and other small craft.

**Type of wharf construction.**—Practically every wharf is of quay construction, that is, lies parallel to the stream, and all are constructed of untreated piles with timber decks.

**Port administration.**—The control of the port is vested largely in the municipality, the administrative authority being exercised through a board known as the commission of public docks. This commission, which was created in the fall of 1910 by an amendment to the city charter, consists of five members appointed by the mayor for terms of five years. They serve without pay. The staff of the commission includes a chief engineer who is also the secretary of the commission, 1 assistant engineer, 1 assistant secretary, 3 draftsmen, 1 transitman, 2 chainmen, 2 wharfingers, 2 electrician-machinists, 6 dock watchmen, and 2 clerks.

The funds for the construction of wharves and warehouses were provided by a bond issue of $2,500,000, which was approved by popular vote in 1910. Funds for maintenance and operation are provided from revenues and from annual tax levies, which can not exceed one-tenth of a mill in addition to amounts required for interest and sinking-fund charges.

Another port authority is the Port of Portland, an independent board created by the State in 1891. This body consists of seven members chosen by the State legislature. They are chosen for an indefinite term and serve without pay. The active head is the general manager selected by the board.

This board has power to levy taxes independently of the city. Its jurisdiction for purposes of taxation extends only to a small district beyond the city, and the levy may not exceed 1.85 mills per annum. The Port of Portland was created primarily for the purpose of improving the harbor at Portland and the Willamette and Columbia Rivers from the harbor to the ocean. Its purpose was not, however, to provide port facilities at Portland. To January 1, 1915, this commission had expended about $4,000,000 in the improvement of the river.

The Port of Portland was later charged with the construction of a State dry dock, which it operates, and with the maintenance of a bar and river pilotage and towage service. It has authority also to furnish coal and supplies to ships.

**Port charges.**—*Pilotage.*—Pilotage in each direction between sea and Astoria is $1.50 per foot draft and 1 cent per net register ton. Pilotage on the river between Astoria and Portland is $1 per foot draft and 1 cent per net register ton in each direction. A pilot is not required between Portland and Astoria, or between intermediate points, when a vessel is towed, and the Port of Portland absorbs the charge for pilotage between sea and Astoria on any vessel that is towed by a tug belonging to the Port of Portland.

The maximum charge that can be made for pilotage is fixed by the State board of pilot commissioners. Pilots may charge less.

*Towage.*—The charges for towage are regulated by the Port of Portland, which performs towing service. The following charges based on net register tonnage are made for towing, between Port-

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land and the sea and return, vessels other than those carrying lumber between domestic ports:

| | Round trip. |
|---|---|
| 500 to 700 tons | $500.00 |
| 701 to 1,000 tons | 550.00 |
| 1,001 to 1,200 tons | 600.00 |
| 1,201 to 1,500 tons | 650.00 |
| 1,501 to 1,800 tons | 700.00 |
| 1,801 to 2,000 tons | 750.00 |
| 2,001 to 2,500 tons | 800.00 |
| 2,501 to 3,000 tons | 850.00 |
| 3,001 to 3,500 tons | 900.00 |
| 3,501 to 4,000 tons | 950.00 |

Lumber vessels plying between domestic ports towed between Portland and the sea pay 50 cents per 1,000 feet board measure, subject to a minimum charge based on 300,000 feet of lumber.

The charge for shifting vessels in the harbor is $25 for steamers and $20 for sailing vessels.

*Harbor dues.*—No harbor dues are assessed at this port.

*Dockage.*—No dockage is charged against a vessel receiving or discharging cargo, but the followng charges based on net register tonnage are made when a vessel is idle or is undergoing repairs at a municipal dock:

| | Per day. |
|---|---|
| 1 to 50 tons | $0.50 |
| 51 to 100 tons | 1.00 |
| 101 to 150 tons | 1.50 |
| 151 to 200 tons | 2.00 |

Vessels of 201 tons or over must pay $2 for the first 200 tons and one-quarter of a cent for each additional ton. Vessels occupying outside berth pay one-half of the above rates.

*Wharfage.*—At the municipal docks the general wharfage charge is 25 cents per ton of 2,000 pounds, or 40 cubic feet, at the option of the wharfinger, except on the following articles:

| | | |
|---|---|---|
| Automobiles and vehicles, set up: | | |
| Under 2,000 pounds | each.. | $0.25 |
| 2,000 pounds and over | do.... | .50 |
| Crushed rock, gravel, and sand | per cubic yard.. | .20 |
| Hops | per bale.. | .05 |
| Lath | per 1,000.. | .05 |
| Live stock | per head.. | $0.10–1.00 |
| Lumber | per 1,000 feet.. | .50 |
| Piling | per linear foot.. | .00½ |
| Shingles | per 1,000.. | .04 |
| Wood | per cord.. | .20 |
| Coal, coke, and pig iron | per long ton.. | .25 |

One-half of the regular wharfage rates is charged on freight transferred from one vessel or barge to another but not using the wharf's facilities in its transfer. No charge is made for lumber, lath, shingles, logs, or piling loaded from barges or rafts while vessels are loading or discharging other cargo from or upon the wharf. Eighty per cent of the basic wharfage rates is charged on freight loaded over the open section of Dock No. 1 direct from cars or vehicles to vessel or raft, or vice versa.

A free-storage period, exclusive of Sundays and holidays, of 5 days is allowed in case of Pacific Coast shipments, inward and outward, 7 days on foreign and Atlantic Coast shipments, inward, and

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10 days on foreign and Atlantic Coast shipments, outward. In the case of brick, salmon, flour, fire clay, hops, cement, coal, coke, pig iron (and grain on Dock No. 2), the free storage is 30 days, and in the case of glass, and lumber in excess of 100,000 feet b. m., 15 days.

The wharfage charges on railroad and private docks correspond in general to those assessed at the municipal docks.

Prior to December 1, 1913, published tariffs of the Oregon-Washington Railroad & Navigation Co. and Spokane, Portland & Seattle Railway Co. provided for nonassessment of wharfage and of charges for the loading or unloading of cars at Portland on merchandise from Asia, the Hawaiian Islands, the Philippine Islands, California, and Alaska, interchanged with water carriers and passing over the docks of these railroads, if originating at or destined to competitive rail points beyond certain limits. These tariffs also provided for the absorption of these charges up to 50 cents per ton by the railroad receiving the line haul when merchandise was handled over any of the Willamette River docks. Effective December 1, 1913, the tariffs were so amended as to provide for these absorptions only on the docks operated by the competing railroad.

The dock commission, after several conferences with the railroads, succeeded in having these tariffs amended, effective December 4, 1914, whereby the railroads assume wharfage, loading, and unloading charges not exceeding 50 cents per ton of 2,000 pounds, or 40 cubic feet measurement, on carload freight to or from Asia, the Philippine Islands, or the Hawaiian Islands, when originating at or destined to points on their lines and connections beyond certain points specified in their tariffs. These absorptions also apply on canned salmon, pickled, salted, and frozen fish, but do not apply to Pacific northwest coast grains or grain products. By the absorption of these charges by the railroads this port has been placed on an equal basis with Puget Sound ports on this class of business.

## SACRAMENTO, CAL.

Sacramento is situated on the Sacramento River, about 111 miles northeast of San Francisco. The distance from the ocean at the entrance to the Golden Gate to the mouth of the river, by way of San Francisco Bay, San Pablo Bay, and Suisun Bay, is 50 miles, while the distance from the mouth of the river to the city of Sacramento is 61 miles.[a]

Vessels drawing 15 feet of water may be brought from the ocean to the mouth of the river at mean low tide; the river channel from its mouth to the city has a minimum depth at mean low water of 7 feet.[a]

In regard to the importance of the Sacramento River from a commercial standpoint the Chief of Engineers of the United States Army states:

> The Sacramento River is important as the means for transporting both freight and passengers, steamboats plying regularly all the year round between San Francisco and Chico Landing (about 168 miles above Sacramento). Extensive areas of land along the Sacramento River are under a high state of cultivation, much of which is dependent upon the stream as a means of transportation for passengers and freight. The maintenance of the projected channels is important, as much of the freight is of a perishable character and can not be subjected to delay when ready for the market.[a]

[a] Report, Chief of Engineers, U. S. Army, 1914, pp. 1338-1340.



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**Railroads.**—Sacramento is served by two trunk-line railroads, the Southern Pacific and the Western Pacific, and by three electric railways, one operating to Oakland, one to points in the Sacramento Valley above the city of Sacramento, and one to Stockton. The lines to the Sacramento Valley and to Stockton handle freight as well as passengers.

**Steamship lines.**—The principal regular lines of steamships operating on the Sacramento River are the California Transportation Co. and the Southern Pacific Co., each of which operates two boats daily, except Sunday, in each direction between San Francisco, Sacramento, and intermediate points on the Sacramento River, and the Sacramento Transportation Co., which operates small boats between Sacramento and Red Bluff, about 201 miles above.

In addition, numerous small craft ply between the two cities and the small intermediate towns. The total number of boats operating on the river in the calendar year 1913, as reported by the Chief of Engineers, United States Army, included 25 stern-wheel and screw-propeller steamboats, 19 screw-propeller gasoline boats, 60 gasoline launches, and 45 scows and barges that are regularly engaged in transporting freight and passengers on the Sacramento River exclusively, in addition to 13 stern-wheel and screw-propeller steamboats, 42 screw-propeller gasoline boats, 78 gasoline launches, and 34 scows and barges that operate on the Sacramento River more or less irregularly.[a]

**Commerce of the port.**—The water-borne commerce of the Sacramento River during the calendar year 1914, as reported by the Chief of Engineers, United States Army, consisted of 721,090 short tons of freight, valued at $38,211,760.[b] In the year 1913, which was a more nearly normal trade year and is therefore preferable for purposes of discussion, the commerce amounted to 733,594 short tons, valued at $35,856,791.[c] The report states that these figures were compiled from data supplied by 67 operators and are probably incomplete. Although these statistics relate to the Sacramento River as a whole, they are believed to represent substantially the commerce of the port of Sacramento. The following is a list of commodities comprising the reported commerce on the Sacramento River in the calendar year 1913:

| Commodities. | 1913 | | 1914 | |
|---|---|---|---|---|
| | Short tons. | Value. | Short tons. | Value. |
| Miscellaneous merchandise | 203,167 | $20,316,700 | 157,954 | $19,744,250 |
| Canned and dried fruits, vegetables, and meats | 20,843 | 3,334,880 | 26,410 | 3,276,930 |
| Live stock | 15,346 | 3,069,200 | 4,909 | 802,030 |
| Grain | 78,827 | 2,364,810 | 78,561 | 1,981,240 |
| Fruit, fresh | 15,880 | 2,223,200 | 14,109 | 987,630 |
| Vegetables, fresh | 40,638 | 1,625,520 | 77,169 | 3,652,260 |
| Oil, fuel and other grades of | 119,300 | 1,025,980 | 97,154 | 634,606 |
| Lumber | 70,778 | 920,114 | 50,549 | 505,490 |
| Hay | 46,661 | 653,254 | 30,371 | 242,968 |
| Mill stuffs, flour, etc | 4,310 | 129,300 | 1,025 | 62,790 |
| Brick | 30,653 | 89,507 | 29,940 | 89,820 |
| Sand and gravel | 82,803 | 60,446 | 81,807 | 54,538 |
| Coal | 4,388 | 43,880 | 3,833 | 30,664 |
| All other | ..... | ..... | 67,299 | 6,146,544 |
| Total | 733,594 | 35,856,791 | 721,090 | 38,211,760 |

[a] Report, Chief of Engineers, U. S. Army, 1914, pp. 1340–1341.
[b] Idem, 1915, p. 3347.
[c] Idem, 1914, p. 3171.

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**Extent and ownership of water front.**—Approximately 19,000 feet of water front are available within the city limits of Sacramento. Much of this frontage is unimproved. Titles to nearly all of the water-front property are badly confused and have been the subject of long-standing litigation. The following statement, prepared by the Chamber of Commerce of Sacramento, describes the present situation with regard to the water front of that city:

A great deal of the water-front property of the city of Sacramento is now tied up in litigation and the ownership still remains undecided. In September, 1911, the city annexed considerable territory, about 9,360 feet of which was along the water front, south of the old city limits. This portion of the water front is not in dispute. It is owned by the owners of abutting property and extends from the old city limits to a point south of the old city limits known as the Sutterville Road.

The property between the north line of Y Street and the north line of Q Street is also privately owned, according to the terms of a decision rendered by the Supreme Court of the State of California in the case of City of Sacramento *v.* Klune (129 Cal., 29). From the north line of Q Street to the north line of I Street, which is the busiest section of the water front, the property is still in litigation. There are four claimants: (1) The city of Sacramento, (2) the Southern Pacific Co. and subsidiary corporations, (3) grantees of John A. Sutter, jr., and (4) owners of lots abutting upon the east side of Front Street.

The Southern Pacific Co. is in possession from the north line of M Street to the south line of I Street. The city of Sacramento is in possession from the north line of M Street to the south line of N Street, also the property upon which is constructed the new city wharf between O and P Streets.

The Western Pacific Co. is in possession, under franchise from the city, from M Street to Q Street, except the new city wharf referred to in the preceding paragraph. From I Street to the northerly city limits the titles are badly confused. The Southern Pacific Co. has practical possession or franchise rights to the remainder of water front from I Street to northern city limits.

**Terminals.**—The city of Sacramento owns a number of water terminals. The following list shows the principal wharves, which, for convenience, have been numbered:

Wharf No. 1, which is 390 feet long and 50 feet wide. This wharf has a warehouse or shed and is equipped with one electric elevator for transferring freight between the wharf and boats. This wharf is served by the Northern Electric Railway Co. and is used by the boats of the California Transportation Co. It is open to public use.

Wharf No. 2, which is 65 to 70 feet long and 60 feet wide. This wharf, which has a warehouse and is equipped with one electric freight elevator, has railroad connections and is used daily by water carriers. It is open to public use.

Wharf No. 3, which is 235 feet long and from 40 to 50 feet wide. This wharf is used exclusively by the Sacramento Transportation Co. under an old franchise, which has expired. The company owns both the warehouse which covers part of this wharf and the steam elevator.

Wharf No. 4, which is 140 feet long and 50 feet wide. This wharf is used by the Sacramento Coal Co. Coal is transferred from barges by means of orange-peel buckets.

Wharf No. 5, which is 60 feet long and 50 feet wide. The land is owned by the city, but the wharf and the structures were erected by the Associated Oil Co., which occupies the property. This wharf is equipped with pumps for transferring oil from boat to tank on shore.

Wharf No. 6, which is 270 feet long and 60 feet wide. This wharf is partly covered and is equipped with one electric freight elevator. It has railroad connections and is open to public use.

Wharf No. 7, which is 270 feet long and 54 feet wide. The land is owned by the city, but is leased to the Western Pacific Railway Co., which constructed the wharf and warehouse. This wharf is used daily by the river boats during the fruit and vegetable shipping season, and is equipped with an electric elevator for transferring freight from boat to wharf.

The Southern Pacific Co. owns two terminals at Sacramento. One has a warehouse 332 feet long and from 60 to 124 feet wide while the

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other has a warehouse 1,522 feet long and 40 feet wide. Both wharves and warehouses are connected by spur tracks with the Southern Pacific Railway and are used chiefly by the boats operated by the company. Freight is transferred from boat to warehouse by hand trucks and a belt conveyor at the former wharf and by one steam and three electric elevators at the latter.

In addition to the wharf leased from the city, the Western Pacific Railway owns a wharf 250 feet long and 54 feet wide, which also is equipped with an electric freight elevator and is used daily by the river boats during the fruit and vegetable shipping season.

Two wharves, one 230 feet long and 70 feet wide and the other 315 feet long and from 60 to 85 feet wide, are owned by lumber companies.

**Type of wharf construction.**—The wharves are of pile-and-timber construction and are parallel to the stream. The level of the wharves is about 25 feet above the level of the river and freight elevators are required to raise and lower the freight.

**Port administration.**—This port is under the control of the municipality, the administrative authority being vested in the commissioner of public works. The only active port official is the harbor master. In addition to the harbor master, there are five men employed to operate the elevators at the wharves.

**Port charges.**—*Pilotage and towage.*—Pilotage and towage are not necessary, since only local river boats call at this port.

*Harbor dues.*—No harbor dues are assessed at this port.

*Dockage.*—Vessels of 75 net tons or more pay 1 cent per net register ton per day for the privilege of docking at the municipal wharf. Vessels of more than 10 tons but less than 75 tons pay a dockage charge of 25 cents per day.

Regular lines of steamboats may occupy specially assigned wharf space, not to exceed 300 feet, by the payment of 50 cents per linear foot per month in addition to the regular charges for dockage and elevator service, but are not required to pay wharfage.

*Wharfage.*—At the municipal wharves a wharfage charge of 10 cents per ton is assessed on general merchandise and on hay and straw and 10 cents per 1,000 feet b. m. on all lumber and timber products.

*Elevator service.*—A charge of 70 cents per hour or portion of an hour is made for the use of the freight elevators at the municipal wharves. The charge for elevator service is in addition to the charges for dockage and wharfage.

## SAN DIEGO, CAL.

San Diego is located on San Diego Bay about 10 miles north of the boundary between the United States and Mexico, 102 miles south of Los Angeles Harbor, and 554 miles south of San Francisco.

This harbor is landlocked and has been described as "the best natural harbor south of San Francisco."[a] With a 21-foot depth of water at mean lower low water the harbor is from 500 to 2,000 feet wide and about 9 miles long and has a water area of about 21 square miles.[b] The San Diego water front is reached by means of a channel having a minimum width of 600 feet and a least depth of 30 feet. A

[a] Pacific Coast Pilot, 1909, p. 40. [b] Report, Chief of Engineers, U.S. Army, 1914, pp. 1308–1309.

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project to increase the depth across the bar to 35 feet and through the "middle ground" to 32 feet at mean low water is now partially completed. The mean range of tide is 5 feet.

**Railroads.**—One of the principal handicaps to the development of the port of San Diego has been its lack of direct railroad connections. At the present time the only trunk-line railroad entering the city is the Atchison, Topeka & Santa Fe system, which has a branch line extending from Los Angeles.

The San Diego & Arizona Railway Co. is now engaged in the construction of a line from San Diego to Seeley, Cal., a distance of 137.9 miles, which will give San Diego a short line to Yuma, Ariz., where connection can be made with the Southern Pacific Railway. This line will tap the rich Imperial and Salt River Valleys, which are now being developed. On June 30, 1914, 76.5 miles of this railroad had been completed and several sections were in operation.[a]

The only other railroad serving San Diego is the San Diego & Southeastern Railway, which is apparently controlled by the same interests as the San Diego & Arizona Railway. This railway is, however, merely local, as it has only 73.49 miles[b] of track and connects San Diego with only the small towns in the immediate vicinity.

**Steamship lines.**—The following is a list of the principal coastwise steamship lines that regularly call at San Diego:

American-Hawaiian Steamship Co., which operates a fleet of large freight steamers between Atlantic and Pacific coast ports via the Panama Canal. At the present time only one vessel a month calls at San Diego and that on its westbound trip, calling also at Los Angeles, San Francisco, Portland, and Seattle.

North Pacific Steamship Co., which operates one steamer weekly in each direction between San Diego, Los Angeles, Santa Barbara, San Francisco, and Portland.

Pacific Coast Steamship Co., which operates two boats weekly in each direction between San Diego, Los Angeles, San Francisco, and Seattle.

Pacific Navigation Co., which maintains a schedule of four sailings weekly in each direction between San Diego, Los Angeles, and San Francisco.

Panama Pacific Line of the International Mercantile Marine Co., which operates two large steamers through the Panama Canal between New York and San Francisco. The sailing schedule of this line for 1915 shows two calls at San Diego on the westbound and one call on the eastbound trip during the period from May 1 to November 20.

Apparently no line of steamships engaged in foreign trade calls regularly at the port of San Diego.

**Commerce of the port.**—The water-borne commerce of the port of San Diego in the calendar year 1914 consisted of 654,087 short tons, valued at $60,184,675.[c] In the year 1913, which was a more nearly normal trade year and is therefore preferable for purposes of discussion, the commerce amounted to 631,022 short tons, valued at $55,840,124.[d] From the standpoint of value, general merchandise was by far the most important item reported for 1913, its value being $51,592,640. Next in rank were lumber and timber products, $2,664,525; oil, $1,294,923; and grain, $234,840. From the standpoint of tonnage the principal items were lumber and timber products, 274,342 short tons; oil, 989 short tons; and general merchandise, 161,227 short tons.

It should be noted that the valuation placed on general merchandise is $320 per short ton, or 16 cents per pound, which appears to be extremely high. Unfortunately no information is at hand to show the general character of this important item.

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[a] Poor's Manual of Railroads, 1915, p. 490.
[b] Idem, p. 1039.
[c] Report, Chief of Engineers, U. S. Army, 1915, p. 3324.
[d] Idem, 1914, p. 3140.

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**Extent and ownership of water front.**—The title to all the tide lands in the harbor was vested in the city by act of the legislature, May, 1911. Approximately 9 miles of water frontage are now available, but only a small portion has as yet been developed. The plan of development provides for the construction of a concrete bulkhead 9 miles in length, which will be the means of reclaiming a strip from 500 to 1,200 feet in width and about 1,350 acres in area.

**Terminals.**—The only publicly-owned terminal at San Diego is the new municipal pier, which is of reinforced-concrete construction. This pier is 800 feet long and 130 feet wide. It is provided with a one-story warehouse of steel construction 700 feet in length and 72 feet in width. On either side of the warehouse the pier has two tracks which connect with the Santa Fe Railroad.

The city has also built 2,675 feet of concrete bulkhead and will thereby reclaim 50 to 60 acres of tide lands. This is provided with a narrow wharf, which has a steel and concrete deck laid on timber piles incased in concrete.

On December 31, 1914, the city of San Diego had issued 5 per cent harbor bonds to the amount of $1,100,000 for the above improvements and had unsold bonds to the value of $300,000.

The principal private terminals are those of the Santa Fe Railway, the Spreckels Bros. Commercial Co., the Pacific Coast Steamship Co., the San Diego Lumber Co., the McCormick Lumber Co., and the Standard Oil Co. Railroad tracks connecting with the Atchison, Topeka & Santa Fe Railway are to be found on the piers of the Spreckels Bros. Commercial Co., the Santa Fe Railway, and the McCormick Lumber Co.

The Spreckels wharf has 1,700 feet of berthage space, 900 feet being in water 22 feet deep and 800 feet in water only 10 feet in depth. The Santa Fe wharf is also quite irregular in shape and has 1,840 feet of berthing space, 640 feet having a 29-foot depth of water alongside, 600 feet having a 24-foot depth, and 600 feet a 22-foot depth.

**Type of wharf construction.**—Because of the shallowness of the water close to the present shore line, piers from 500 to 1,000 feet in length have been constructed. A few of these are straight, but more are irregular in outline. With the exception of the municipal terminal, the piers are of pile-and-timber construction, the piles being protected by concrete casing. The municipal pier has been constructed with timber piles incased in reinforced-concrete cylinders and with a concrete and steel deck. The bulkhead built by the city consists of a concrete wall which has in front of it a narrow wharf constructed on piles of timber incased in concrete and having a steel-and-concrete deck.

**Port administration.**—Prior to 1911 the port of San Diego, like the port of San Francisco, was under the control of a state board of harbor commissioners consisting of three members and having possession and control of the entire Bay of San Diego.[a]

In May, 1911, the California Legislature ceded to the city of San Diego all of the State's title to the tide lands lying within the corporate limits of the city, upon the condition that the city should expend within three years at least $1,000,000 toward the reclamation of the same by the construction of a sea wall and that the city should forever maintain public terminals on the water front.

[a] Political Code of California, 1906, sec. 2577.

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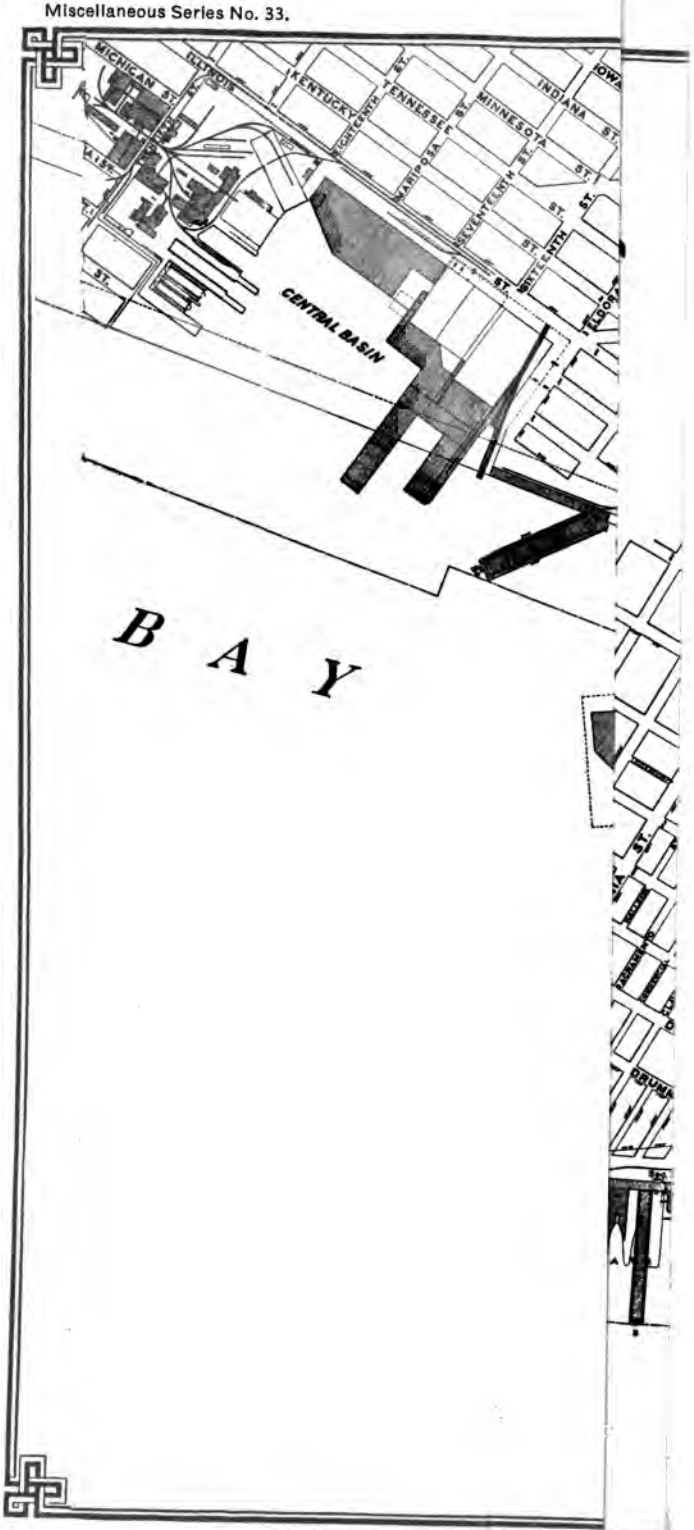


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The administration of port affairs was formerly vested in the mayor and the common council, consisting of five administrative officials, but the city adopted in 1915 the "city manager" form of government. Under the city manager is a city engineer who has charge of the construction of the new municipal terminals and is assisted by a harbor engineer, a hydraulic engineer, and a chief inspector of harbor work. The regulations relative to the movement, mooring, and anchorage in the harbor are enforced by a harbor master.

**Port charges.**—*Pilotage.*—The Board of Pilots for the port of San Diego makes a pilotage charge from sea to sea of $1 per foot draft and 1 cent per net register ton for all vessels touching at San Diego for fuel, water, or stores, and $2 per foot draft and 2 cents per net register ton for all vessels bringing a full cargo to the port. Special rates are made to regular lines. The use of a pilot is optional with vessels engaged in the coastwise trade but is compulsory with all other vessels if a pilot offers his services.

*Towage.*—Towing is not compulsory. This service is rendered at the following rates:

| Net register tonnage of vessels. | Towage charges. | Dockage or undockage charges. | Net register tonnage of vessels. | Towage charges. | Dockage or undockage charges. |
|---|---|---|---|---|---|
| COASTWISE VESSELS. | | | ALL OTHER VESSELS. | | |
| 100 to 150 | $15.00 | $5.00 | 400 to 600 | $50.00 | $15.00 |
| 150 to 200 | 17.50 | 5.00 | 600 to 800 | 65.00 | 17.50 |
| 200 to 250 | 20.00 | 5.00 | 800 to 1,000 | 75.00 | 20.00 |
| 250 to 300 | 22.50 | 5.00 | 1,000 to 1,250 | 90.00 | 22.50 |
| 300 to 350 | 25.00 | 5.00 | 1,250 to 1,500 | 100.00 | 25.00 |
| 350 to 400 | 27.50 | 5.50 | 1,500 to 1,750 | 110.00 | 27.50 |
| 400 to 450 | 30.00 | 6.00 | 1,750 to 2,000 | 120.00 | 30.00 |
| 450 to 500 | 32.50 | 6.50 | 2,000 to 2,250 | 130.00 | 32.50 |
| 500 to 550 | 35.00 | 7.00 | 2,250 to 2,500 | 140.00 | 35.00 |
| 550 to 600 | 50.00 | 8.00 | | | |

The towage charges shown above are for one direction only, towage "from sea to sea," or in both directions, being twice the amounts stated. No charge is made for docking or undocking if the vessel proceeds immediately to or from its berth.

*Harbor dues.*—There are no harbor dues at this port.

*Dockage.*—It has been stated that the city of San Diego plans ultimately to create a "free harbor," in the sense of a port at which no charge for berthing space will be assessed against a vessel. At present, however, the dockage charges, which have been fixed by ordinance [a] of the city common council, are as follows:

For the first 200 net tons or less, 1 cent per ton, and for each additional ton above 200, three-eighths of a cent per ton per day of 24 hours or fraction thereof.

Half rates are charged vessels with no cargo lying idle at the wharf, vessels receiving or discharging ballast, and vessels occupying outside berth.

*Wharfage.*—The rates of wharfage as fixed by ordinance of the common council are the same as those in Los Angeles. (See p. 272.)

## SAN FRANCISCO, CAL.

San Francisco has been described as "a perfect natural harbor close to the sea," located "on the line of the great routes north and south," with "a hinterland which embraces the heart of California's

[a] Ordinance No. 5856, approved Oct. 14, 1914.

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agricultural and mineral producing regions—one of the richest in the world."[a]

The city of San Francisco lies south of the Golden Gate on the inner side of the narrow peninsula which lies between the southern half of San Francisco Bay and the ocean. As far as land communication to the north and east is concerned, the city is practically an island and is connected with the mainland by means of ferries.

San Francisco Bay is about 40 miles long and from 3 to 10 miles wide. The entrance to the bay is about 1 mile wide and has three channels, the main ship channel over the bar, with a depth of 33 feet; the north channel, with 43½-foot depth; and the south channel, with a 36-foot depth. The mean range of tide at Fort Point is 3.7 feet. The United States Coast and Geodetic Survey reports also that from inside the bar to the city the harbor is deep enough for any draft.[b]

Originally the city was separated from deep water in the bay by tidal flats one-half mile or more in width. Most of the tidal land has been reclaimed by the construction of a massive sea wall 14,210 feet in length and the filling of the space between the wall and the previously existing city front. In this manner 32 sea-wall lots, with an aggregate area of 1,051,054 square feet, have been reclaimed. The following is a list of the lots, together with their area, the lessees, and the rental from each:

| Designations of lots. | Area. | Lessees or occupants. | Term of lease. | Total rental for term of lease. |
|---|---|---|---|---|
| | *Square feet.* | | *Years.* | |
| Lot A | 584 | Rented to railroad companies and others from month to month. | | |
| Lot B | 29,518 | Crescent Lumber Co | 25 | $70,500.00 |
| Lot 1 | 72,781 | Rented to railroad companies and others from month to month. | | |
| Lot 2 | 8,677 | ....do | | |
| Lot 3 | 38,849 | ....do | | |
| Lot 4–A | 12,913 | Swift & Co | 25 | 50,400.00 |
| Lot 4–B and C | 15,955 | Midland Warehouse Co | 25 | 62,340.00 |
| Lot 5 | 54,605 | Rented to railroad companies and others from month to month. | | |
| Lot 6 | 13,130 | ....do | | |
| Lot 7 | 87,067 | Western Pacific Railway Co | 25 | 365,625.00 |
| Lot 8 | 30,264 | Belt Railroad, engine house | | |
| Lot 9 | 4,727 | Belt Railroad, property yard | | |
| Lot 10 | 4,326 | Rented to railroad companies and others from month to month. | | |
| Lot 11 | 45,372 | ....do | | |
| Lot 12 | 75,524 | ....do | | |
| Lot 13 | 3,103 | ....do | | |
| Lot 14–A | 18,044 | ....do | | |
| Lot 14–B | 24,585 | Southern Pacific Co | 25 | 150,000.00 |
| Lot 15 | 75,447 | | | |
| Lot 16 | 2,746 | P. J. Moliterno | 25 | 33,060.00 |
| Lot 17 | 23,647 | Rented to railroad companies and others from month to month. | | |
| Lot 18 | 26,793 | ....do | | |
| Lot 19 | 14,623 | Atchison, Topeka & Santa Fe Ry | 15 | 30,708.30 |
| Lot 20 | 93,668 | Belt Railroad, car storage yard | | |
| Lot 21 | 14,625 | ....do | | |
| Lot 22–A | 79,052 | Western Pacific Ry. Co | 25 | 454,406.40 |
| Lot 22–B | 18,743 | ....do | 23 | 82,822.35 |
| Lot 23 | 88,577 | Southern Pacific Co | 25 | 434,400.00 |
| Lot 24–A | 15,763 | Associated Oil Co | 25 | 82,620.00 |
| Lot 24–B | 64,530 | Southern Pacific Co | 25 | 330,000.00 |
| Lot 25 | 10,860 | Rented to railroad companies and others from month to month. | | |

[a] Ports of the Pacific, by Gen. H. M. Chittenden, in Transactions of the American Society of Civil Engineers, Vol. LXXVI (1913), p. 155.

[b] Table of Depths for Channels and Harbors, Coasts of the United States, 1913, p. 90.

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**Railroads.**—San Francisco is served by the Atchison, Topeka & Santa Fe, the Northwestern Pacific, the Southern Pacific, and the Western Pacific Railroads. All of these railroads are connected by rail and by car float with the State Belt Railroad, which is an integral part of the harbor system and reaches all of the terminals along the water front.

The belt railroad is one of the most important adjuncts of the port of San Francisco. It was established in 1891 and is owned, controlled, and operated by the State board of harbor commissioners. The total length of line from the north side of Second Street Wharf, the present southerly terminus, and Beach and Laguna Streets, the proposed northerly terminus, is 3.70 miles. The plans call for 1.86 miles of single track, 0.64 mile of double track, and 1.20 miles with three tracks. Formerly the line was operated in two disconnected divisions, one being located to the north of Market Street and running from Powell Street to Jackson Street, and the other to the south of Market Street and extending from Harrison to Second Street. When it was desired to transfer a car from one division of the belt road to the other, it was necessary to use a car-ferry operated by the Southern Pacific Co. This method of transfer was not only slow and inefficient but also costly, since the charges for car-ferry service ranged from $11 to $15 per car.

The two divisions of the road were recently joined by a connection 3,900 feet long, which crosses the foot of Market Street and extends from Broadway to Folsom Street, and it is now possible to obtain uninterrupted switching service along the entire developed water front. A continuation of the road from Powell Street, its former northerly terminus, to the Government transport docks at Fort Mason, has only recently been completed. A part of this line runs through a tunnel 1,500 feet long and much also is on trestles. The extension of the belt railroad to Fort Mason cost about $300,000 and the United States Government has agreed to pay to the belt railroad, in addition to the regular switching charge, a tunnel charge on every car going through the tunnel until the cost of the tunnel proper is paid for. In this manner much of the cost of this extension is borne by the Federal Government. Inasmuch as the Government wharves at Fort Mason are used for transport and other Army purposes, the connection with the belt line and other railroads is a decided benefit.

A number of miles of sidings and spurs have been constructed to serve the various industries and warehouses along the water front. Tracks from the belt line are being laid on all of the new piers. Piers Nos. 26, 28, 30, 32, 37, 39, 41, and 46 have two tracks each, Nos. 15, 17, 25, and 27, one track each. Of the piers under construction or about to be constructed, Nos. 16, 18, 29, 31, 33, and 35 are to have two tracks each, while Nos. 22 and 24 are to have one track each.

The rolling equipment of the belt railroad consists of five locomotives. During the year ended June 30, 1914, 112,075 cars, 73,901 loaded and 38,174 empty, were handled by the belt railroad. The total revenues of the railroad for the same year were $193,993.

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**Steamship lines.**—The following is a list[a] of the principal lines of steamships engaged in foreign trade that call regularly[b] at the port of San Francisco:

| Lines. | Sailings. | Ports of destination. |
|---|---|---|
| American-Hawaiian Steamship Co. | 2 or 3 monthly.... | Honolulu and Kahului (Hawaii). |
| East Asiatic Co. (Ltd.)..... | 1 monthly..... | Scandinavian ports. |
| Hamburg-American Line[a]... | .....do..... | Yokohama, Kobe, Shanghai, Hongkong, Manila, and Singapore. |
| Harrison Direct Line..... | .....do..... | London, Liverpool, and Glasgow. |
| Jebson Line..... | 1 every 3 weeks... | West coast of Mexico and Central America. |
| Johnson Line..... | 1 monthly..... | Scandinavian ports. |
| Kosmos Line[a]..... | .....do..... | Mexico, Central and South America, London, and Hamburg. |
| Maple Leaf Line..... | ....do..... | Swansea, Dunkirk, London, etc. |
| Matson Navigation Co..... | 1 weekly..... | Honolulu. |
| New York & Pacific Steamship Co. | 1 monthly..... | West coast of Central and South America. |
| Oceanic Steamship Co..... | 1 every 2 weeks... | Honolulu. |
| Do..... | 1 every 4 weeks... | Pago Pago (Samoa) and Sydney (Australia). |
| Pacific Coast Steamship Co.... | 3 monthly..... | West coast of Mexico. |
| Pacific Mail Steamship Co..... | .....do..... | West coast of Mexico and Central America. |
| Pacific Mail Steamship Co. and Toyo Kisen Kaisha.[b] | 4 or 5 monthly.... | Honolulu, Yokohama, Kobe, Nagasaki, and Hongkong. |
| Union Steamship Co. of New Zealand (Ltd.). | 1 every 4 weeks... | Tahiti, New Zealand, and Australia. |

[a] Service suspended on account of war in Europe. [b] Joint service.

The following table contains a list of the principal regular lines that operate in the coastwise and the local bay and river trade of the port:

| Lines. | Sailings. | Ports of destination. |
|---|---|---|
| COASTWISE LINES. | | |
| American-Hawaiian Steamship Co. | 2 weekly..... | New York and various Pacific coast ports. |
| Arrow Line..... | 1 weekly..... | Portland, Oreg., and Astoria, Oreg. |
| Atlantic & Pacific Steamship Line. | 1 every 18 days.... | New York and various Pacific coast ports. |
| Boston & Pacific Line..... | ..... | Boston. |
| Dodge Steamship Co..... | 2 weekly..... | Portland, Oreg. |
| Great Northern Pacific Steamship Co. | 1 every 4 days..... | Do. |
| Independent Steamship Co.... | 3 weekly..... | Los Angeles. |
| Luckenbach Steamship Co.... | 1 weekly..... | Los Angeles and New York. |
| North Pacific Steamship Co... | .....do..... | Portland, Oreg., Santa Barbara, Los Angeles, and San Diego. |
| Pacific Alaska Steamship Co.. | 2 weekly..... | Seattle and Tacoma. |
| Pacific Coast Steamship Co.... | .....do..... | Seattle, Victoria, Los Angeles, and San Diego. |
| Pacific Navigation Co..... | .....do..... | Los Angeles and San Diego. |
| Panama-Pacific Line..... | 10 calls in each direction between May 1 and Nov. 20, 1915. | Los Angeles and New York. |
| San Francisco & Portland Steamship Co. | Every 5 days..... | Portland and Astoria, Oreg. |
| LOCAL BAY AND RIVER LINES. | | |
| California Navigation & Improvement Co. | 1 daily except Sunday. | Stockton and points on San Joaquin River. |
| California Transportation Co.. | 2 daily except Sunday. | Sacramento and points on Sacramento River. |
| Do..... | 4 weekly..... | Stockton. |
| Monticello Steamship Co..... | 6 daily..... | Vallejo. |
| Southern Pacific Co..... | 2 daily except Sunday. | Sacramento. |

[a] Compiled chiefly from 1915 edition of the Exporters' Encyclopedia, pp. 1126–1128.
[b] Except as interrupted by the European war.

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In the coastwise trade several lines of vessels owned by lumber companies are engaged in the lumber trade between British Columbia and Puget Sound ports and San Francisco.

The general character of the vessels operating at the port of San Francisco may be inferred from the data contained in the following table,[a] which shows the number, net tonnage, and arrivals of vessels, classified by kind, at the State wharves during the period July 1, 1912–June 30, 1914:

| Class of vessels. | Number. | Net tonnage. | Times arrived. | Class of vessels. | Number. | Net tonnage. | Times arrived. |
|---|---|---|---|---|---|---|---|
| Ocean steamers | 400 | 796,207 | 21,772 | United States Government vessels | 18 | 6,793 | 336 |
| Bay and river steamers | 75 | 16,943 | 32,133 | Tugs | 74 | 3,822 | 4,645 |
| Ships | 37 | 75,676 | 159 | Lighters | 224 | 25,003 | 9,029 |
| Barks | 51 | 80,226 | 246 | Launches | 119 | 955 | 2,780 |
| Barkentines | 21 | 19,438 | 191 | Barges | 97 | 45,630 | 4,816 |
| Brigs | 3 | 1,117 | 8 | | | | |
| Schooners | 217 | 46,214 | 8,625 | | | | |
| Sloops | 16 | 215 | 765 | Total | 1,352 | 1,118,239 | 85,505 |

The following table[a] shows the number of ocean steamships that called during the two-year period July 1, 1912–June 30, 1914, classified by net tonnage:

| | | | |
|---|---|---|---|
| Over 8,000 | 3 | 2,000 to 3,000 | 49 |
| 7,000 to 8,000 | 3 | 1,000 to 2,000 | 43 |
| 6,000 to 7,000 | 1 | 500 to 1,000 | 52 |
| 5,000 to 6,000 | 12 | Under 500 | 126 |
| 4,000 to 5,000 | 34 | | |
| 3,000 to 4,000 | 77 | Total | 400 |

**Commerce of the port.**—The water-borne commerce of the port of San Francisco in the calendar year 1913 consisted of 9,353,530 short tons of freight, valued at $539,980,306; of these amounts, 1,198,838 short tons, valued at $119,883,800, were carried on the ferries plying between San Francisco and Oakland.

The following is a list of the commodities comprising the commerce of the port in the calendar year 1913:[b]

| Commodities. | Short tons. | Value. |
|---|---|---|
| Flour | 157,240 | $9,119,920 |
| Wheat | 221,823 | 7,985,628 |
| Barley | 201,555 | 7,054,425 |
| Oats | 30,400 | 1,200,000 |
| Corn, rye, etc | 5,753 | 218,614 |
| Fruit, fresh and dried | 106,890 | 16,258,810 |
| Lumber, shingles, shakes, railroad ties, posts, poles, etc | 2,294,724 | 35,003,021 |
| Lime, cement, building materials, etc | 87,265 | 20,090,874 |
| Hides, leather, pelts, skins, tallows, etc | 63,651 | 16,396,144 |
| Matting, sugar, tea, silk, etc | 392,372 | 40,157,239 |
| Wines, brady, whisky, vermouth, beer, champagne, etc | 127,355 | 14,259,646 |
| Sulphur, fertilizer, nitrate, live stock, coke, coal, etc | 591,558 | 12,638,539 |
| Shoya, copra, kapok, sake, beans, onions, potatoes, etc | 175,646 | 8,717,300 |
| Coffee, rice, hay, straw, feed, butter, eggs, cheese, etc | 297,627 | 25,204,552 |
| Iron, steel, tin, hardware, cordage, gunnies, jute, wool, hops | 156,604 | 41,015,751 |
| Fuel oil, refined oils, olive oils, etc | 2,445,494 | 25,250,977 |
| Salmon, codfish, dried fish, Chinese merchandise, paper, malt | 157,987 | 33,115,148 |
| Dry goods, cotton goods, general merchandise, boots and shoes, furniture, glassware, tobacco, cigars, etc.[c] | 1,559,691 | 178,316,500 |

[a] Biennial Report, Board of State Harbor Commissioners for 1913 and 1914, pp. 79–80.
[b] Report, Chief of Engineers, U. S. Army, 1914, p. 3149.
[c] Of this item 1,198,838 tons, at an estimated valuation of $119,883,800, was carried on the ferries plying between San Francisco and Oakland, which ferries draw not to exceed 10 feet of water.

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| Commodities. | Short tons. | Value. |
|---|---|---|
| Groceries, canned goods, ham, bacon, lard, provisions, etc. | 106,757 | $16,418,816 |
| Salt, quicksilver, honey, drugs, soap, candles, spice, bread | 24,078 | 3,293,469 |
| Arms, ammunition, dynamite, powder | 1,910 | 4,096,586 |
| Pipe, paint, molasses, tan bark, ginseng, asphaltum | 38,979 | 2,383,784 |
| Starch, wood, hair, nuts | 3,595 | 549,490 |
| All other articles | 104,646 | 10,464,600 |
| Treasure | | 10,769,673 |
| Total | 9,353,600 | 539,979,506 |

These commodities are grouped as follows in the report on the commerce of San Francisco for the calendar year 1914:[a]

| Commodities. | Short tons. | Value. | Commodities. | Short tons. | Value. |
|---|---|---|---|---|---|
| Building and construction materials | 2,421,971 | $65,120,130 | Leather | 4,690 | $2,881,800 |
| Cigars, tobaccos, pipes | 7,614 | 7,655,816 | Live stock | 24,292 | 2,915,040 |
| Explosives, arms, ammunition | 1,070 | 211,810 | Machinery and implements | 26,906 | 8,061,660 |
| Flour and millstuffs | 135,386 | 6,867,265 | Metals and ores | 56,154 | 5,174,370 |
| Fruits and nuts | 290,516 | 44,555,845 | Miscellaneous (seeds, paper, shells, drugs, bark, etc.) | 88,801 | 20,527,031 |
| Fuel | 423,373 | 2,811,721 | Oils | 3,377,060 | 66,519,225 |
| Furniture and fixtures | 285 | 273,810 | Paint | 3,561 | 1,370,985 |
| General merchandise [a] | 1,346,166 | 141,886,650 | Provisions and dairy produce | 67,946 | 11,680,011 |
| Glassware and crockery | 77 | 27,278 | Shipping sundries (shooks, shakes, bags, gunnies, etc.) | 25,710 | 430,270 |
| Grain, feed, hay, and straw | 919,736 | 32,190,760 | Treasure | | 3,866,677 |
| Groceries, spices, and vegetables | 371,404 | 66,142,786 | Total | 9,907,549 | 554,063,227 |
| Hardware, tinware, and plumbing supplies | 32,605 | 8,512,492 | | | |
| Hides, wool, cotton, etc. | 124,935 | 22,921,595 | | | |
| Liquors | 157,291 | 31,458,200 | | | |

[a] Of this amount 1,245,714 tons, of an estimated value of $124,571,400, were carried on the ferries plying between San Francisco and Oakland, which ferries draw not to exceed 10 feet of water.

**Extent and ownership of water front.**—All the frontage from the Presidio on the north to the Union Iron Works on the south, about 8 miles in all, is owned by the State of California and is under the control of the Board of State Harbor Commissioners. Along this entire frontage the State owns the area between the bulkhead and the pierhead lines established by the War Department. Much of this area, however, lies under water and no control over the same is exercised, the State having improved only about 4 miles of frontage. South of the frontage improved by the State are a number of private piers and wharves. Since these are generally inside of the harbor lines, they may be cut off from the bay when the State, under authority of law, extends its wharf system. An excellent map showing the principal terminals at this port will be found opposite page 295 of this report.

**Terminals.**—The following table contains a list of the State piers and pier sheds, with the dimensions and character of construction of each pier and shed:

[a] Report, Chief of Engineers, U. S. Army, 1915, p. 3330.

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| Designation of piers. | Dimensions and character of construction. | | | | | |
|---|---|---|---|---|---|---|
| | Piers. | | | Pier sheds. | | |
| | Length. | Width. | Character of construction.[a] | Length. | Width. | Character of construction. |
| NORTH OF MARKET STREET. | *Feet.* | *Feet.* | | *Feet.* | *Feet.* | |
| Pier 3 | 820 | 80 | Type A | 594 | 72 | Timber. |
| Pier 5 | 799 | 110 | do | 779 | 102 | Do. |
| Pier 7 | 600 | 100 | Type B | 576 | 90 | Do. |
| Pier 9 | 820 | 131 | Type D | 781 | 90 | Do. |
| Pier 11 | 801 | 113 | Type A | 775 | 90 | Do. |
| Pier 13 | 801 | 100 | Type D | 366 | 90 | Do. |
| Pier 15 | 794 | 90 | Type A | | | |
| Pier 17 | 800 | 126 | Type D | 781 | 98 | Do. |
| Pier 19 | 600 | 100 | Types A and B | 571 | 81 | Do. |
| Pier 21 | 600 | 107 | do | 571 | 81 | Do. |
| Pier 23 | 600 | 100 | do | 571 | 85 | Do. |
| Pier 25 | 592<br>600 | 135 | do | 571 | 105 | Do. |
| Pier 27 | 600 | 122 | Types A and D | 572 | 100 | Do. |
| Pier 29 | 800 | 200 | Type E | | | Do. |
| Pier 31 | 804 | 140 | | | | |
| Pier 33 | 820 | 140 | | | | |
| Pier 35 | 975<br>817 | 200 | Type E | 1,021<br>906 | 161 | |
| Pier 37 | 1,054<br>824 | 200 | Type A | 1,084<br>884 | 160 | Do. |
| Pier 39 | 938<br>879 | 140 | Type E | 881 | 81 | Do. |
| Pier 41 | 1,082<br>882 | 200 | Type A | | | |
| SOUTH OF MARKET STREET. | | | | | | |
| Pier 14 | 650 | 119 | do | | | |
| Pier 16 | 680 | 140 | do | 708<br>714 | 100 | Do. |
| Pier 18 | 680 | 140 | do | 708<br>714 | 100 | Do. |
| Pier 20 | 525 | 111 | Types A and B | 505 | 90 | Do. |
| Pier 22 | 411<br>402 | 125 | Type A | 444<br>436 | 97 | Do. |
| Pier 24 | 800 | 127 | do | 771 | 97 | Do. |
| Pier 26 | 771<br>759 | 200 | Type E | 737<br>750 | 160 | Do. |
| Pier 28 | 677 | 150 | do | 658 | 113 | Steel and concrete. |
| Pier 30 | 655<br>720 | 200 | do | 701<br>723 | 157 | Timber. |
| Pier 32 | 807<br>555 | 200 | do | 750<br>772 | 157 | Do. |
| Pier 34 | 634<br>652 | 130 | Type D | 621 | 109 | Do. |
| Pier 36 | 615<br>717 | 225 | Type F | 271 | 85 | Timber, steel, and concrete. |
| Pier 38 | 667<br>649 | 130 | do | 647<br>631 | 109 | Steel and concrete. |
| Pier 40 | 650 | 130 | do | 631 | 109 | Do. |
| Pier 42 | 650 | 140 | Type C | 630 | 102 | Timber. |
| Pier 44 | 650 | 140 | do | 630 | 102 | Do. |
| Pier 46 | 800 | 200 | Type A | 783 | 159 | Do. |
| Pier 54 | 700<br>770 | 150 | Type E | 695 | 102 | Do. |

[a] Type A.—Treated or untreated timber piles, with timber decks; average cost, about 80 cents per square foot.

Type B.—Clusters of three timber piles in cylinder of plain or reinforced concrete, with timber decks; average cost about $1 per square foot.

Type C.—Same as type B, except caps are of steel I-beams; average cost, about $1.50 per square foot.

Type D.—Single piles encased in plain or reinforced concrete, with timber decks on steel I-beam stringers; average cost $1.50 to $2.40 per square foot.

Type E.—Reinforced concrete cylinders instead of piles, with reinforced concrete decks and stringers.

Type F.—Same as Type E, except that stringers are steel I-beam.

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Only a few of the wharves at San Francisco are privately owned and operated and all of these are located to the south of the frontage improved by the harbor board. The most extensive private wharves are those of the Union Iron Works, which cover a considerable frontage on the south side of Central Basin near the southern limit of the city.

The United States Steel Products Co. has two wharves at the foot of Twentieth Street. About one-quarter of a mile farther to the south the Western Sugar Refining Co. also has two wharves which are adjacent to its sugar refinery. The Western Pacific Railway Co. has a car-ferry slip at the foot of Twenty-fifth Street.

**Type of wharf construction.**—This subject is covered in detail in footnotes to the table on page 301. In this connection the following extracts from a special report on types of pier construction at the port may be of interest. This report was made by a committee of three engineers who were requested by the San Francisco Chamber of Commerce to make an investigation of this subject.

In the past the types of wharf supports have been untreated piles, creosoted piles, untreated piles incased in concrete and built under the Holmes patent, the Kaetitz patent, and the Black patent, and reinforced-concrete piers such as are constructed at Piers 36, 38, 40, and 54.

In the waters of San Francisco Bay the untreated fir piling, as is well known, has but a short average life and is, therefore, not to be considered in the construction of new piers or wharves. Creosoted piling has a much longer life and will be referred to further along in this report. The untreated piling incased in concrete, of the types above mentioned, are subject to very rapid destruction by marine borers, if through any accident there should be a defect of any kind in the concrete protection, or if, in the course of time or by reason of unforeseen conditions, the mud line should be so lowered as to expose the wooden piles. Many of the piers or wharves that have been constructed in this manner in the last few years are now in a very bad condition, due in a large measure to these causes.

For the construction of piers or wharves where hardpan foundation is found, we believe that if pile foundations are driven, owing to the shallow depth of the mud, such piles would have little or no support and would be very unstable unless a suitable filling of small rock or other material was dumped around them to provide sufficient lateral stiffness. * * * This leaves no other suitable type of pier or wharf construction except the reinforced-concrete pier style, such as has been previously mentioned, which is a very excellent type of long life and low maintenance cost, but at the same time has the disadvantage of a very heavy initial expense, and is a very difficult construction in which to make alterations if the changing conditions of the port would make new arrangements necessary. * * *

For those portions of the water front where the foundation is of mud of great depth, we believe it will be found most economical, in the long run, to build the piers, or wharves, using creosoted piles for supports, such piles to be of large butt size and of the best quality obtainable; the creosoting to be done by the most approved method known; the deck of such pier or wharf to be framed of cresoted caps with large floor joists.

**Port administration.**—The port of San Francisco has been administered since 1863 by the Board of State Harbor Commissioners. Although a State board, its activities do not extend beyond the limits of the city of San Francisco. The board consists of three members who are appointed by the governor, subject to confirmation by the senate. Their tenure of office is subject to the pleasure of the governor, who is elected for a term of four years. For certain specified purposes the governor of the State and the mayor of the city and county of San Francisco are ex officio members of the board.

The commissioners select one of their number to be president or executive head of the board. The board appoints a secretary, an

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assistant secretary, an attorney, a chief wharfinger, and "such number of wharfingers and collectors as they deem necessary." The engineering work of the board is in the hands of an assistant State engineer from the State department of engineering who is assigned to work in connection with the port of San Francisco.

The following annual salaries are paid to the members of the board and the principal officials: President of board, $5,000; and the other members of board, $3,000 each; secretary, $3,000; assistant secretary, $2,400; attorney, $2,400; chief wharfinger, $3,000; wharfinger, $1,800; collectors, $1,500.

The powers and duties of the board have been defined in considerable detail by various acts of the State legislature. The political code of the State provides that the commissioners shall have possession and control of that portion of San Francisco Bay which extends from the Federal reservation at the Presidio on the north to the line between San Francisco and San Mateo Counties on the south, "together with all the improvements, rights, privileges, easements, and appurtenances connected therewith or in any wise appertaining thereto."

In addition to a general control over the harbor front, the commissioners have authority—

1. To use for loading and landing merchandise, with a right to collect dockage, wharfage, and tolls thereon, such portion of the streets of the city and county of San Francisco ending or fronting upon the waters of said bay as may be used for such purposes without obstructing the same as thoroughfares.
2. To fix and regulate, from time to time, the rates of dockage, wharfage, cranage, tolls, and rents.
3. To construct such number of wharves as the wants of commerce shall require, and to locate such wharves at such points and upon such lines as they may deem most suitable for the best interests of commerce.
4. To repair and maintain all the wharves, piers, quays, landings, and thoroughfares as the wants of commerce may require.
5. To erect all such improvements as may be necessary for the safe landing, loading and unloading, and protection of all classes of merchandise.
6. To construct such harbor embankment or sea wall as shall be necessary to protect the harbor of San Francisco.
7. To dredge such number of slips and docks as the commerce of the Port of San Francisco may require to a depth that will admit of the easy and free ingress and egress of all classes of water craft.

The commissioners are also given the power to make reasonable rules and regulations concerning the control and management of the property of the State intrusted to them. Such parcels of water-front property as are held under lease, it is the duty of the board to acquire, together with the improvements thereon, as soon as the several leases terminate, and the commissioners are empowered "to condemn, purchase, and pay a reasonable compensation for such structures as may have been erected upon the said premises."

The board is also given express power to lay down such number of tracks along and on any portion of the water front as may be necessary to meet the wants of commerce and may permit the use of these tracks under such rules and regulations and at such compensation as the board may determine.

The funds for construction are, in general, raised by bond issues, approved by the State legislature and ratified by popular vote. To date four bond issues have been approved, as follows: $600,000 for the erection and furnishing of the ferry depot at the foot of Market

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Street, approved in November, 1892; $2,000,000 for the construction of wharves, piers, sea wall, State railroad spurs, etc., approved in November, 1908; $1,000,000 for the acquisition by the State of the necessary area for a tidal basin north of India Basin and extending to Islais Creek, approved in November, 1908; $9,000,000 for wharves, piers, sea walls, State railroad, etc., approved in November, 1909.

Salaries and operating expenses, as well as interest on the bonds and allotments for sinking funds, must be provided out of the current revenue of the harbor board, the code requiring the board to collect "such an amount of revenue * * * as will enable the commissioners to perform the duties required of them by authority of this article." On the other hand, the dock board is limited in the amount of the several charges it can make by the stipulation that—

> No greater amount of money shall, in the main, ever be collected, by the collection of dockage, wharfage, tolls, rents, and cranage, than shall be necessary to construct and keep in repair such number of wharves, piers, landings and thoroughfares, and construction sheds, dredge such number of slips and docks, construct a sea wall and harbor embankment, and pay incidental expenses allowed to be paid by this article.[a]

It will be noted that these provisions are similar to those under which the Board of Commissioners of the Port of New Orleans operate.

In the construction of a new wharf the board is empowered to lease the same for a period not to exceed 15 years and for an amount not to exceed the cost of constructing the wharf or pier, rents to be applied in whole or in part to the payment of the cost of construction. The leases are entered into after competitive bids have been received, the law requiring that the privilege of building a new wharf shall be awarded to the person who will pay the amount required to construct it and will execute and take a lease thereof for the shortest period of time.

The commissioners are authorized to lease the various sea-wall lots, but only after notice of intention to lease has been duly published. No lease can be made for a period exceeding 25 years.

All moneys acquired by the board, except such as are necessary to pay salaries, rents, current expenses, and immediate repairs, must be paid into the State treasury and credited to the San Francisco harbor improvement fund.

The following table shows the operating revenues from specified sources received by the harbor board in the fiscal years ended June 30, 1913, and June 30, 1914:

| Sources of revenue. | 1913 | 1914 | Sources of revenue. | 1913 | 1914 |
|---|---|---|---|---|---|
| Dockage | $225,413.20 | $229,188.00 | Belt Railroad: | | |
| Tolls | 376,448.25 | 362,694.80 | Northern division | $158,516.50 | $159,114.00 |
| Wharfage | 10,040.59 | 12,336.36 | Southern division | 29,030.00 | 34,879.00 |
| Rents | 625,173.89 | 670,595.74 | Miscellaneous | 25,455.32 | 50,155.20 |
| | | | Total | 1,450,077.75 | 1,518,963.10 |

It will be noted that the principal source of revenue is rents. This item includes rent charges for preferential assignment of piers and sheds, for use of ferry slips, for various privileges at the Union Depot

[a] Amendment approved Feb. 28, 1876, Amendments 1875-76, p. 43.

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and Ferry House, and for use of sea-wall lots. In the fiscal year ended June 30, 1914, $283,026.26 were received in rents for the use of ferry slips and for privileges at ferry houses and $85,300.61 for use of sea-wall lots, while practically all of the remainder of the rents was derived from preferential assignments of piers and sheds.

**Port charges**—*Pilotage.*—Formerly the rates of pilotage, as fixed by the State legislature, were $3 per foot draft for all vessels under 500 net tons and $3 per foot draft and 3 cents per net register ton for all vessels of more than 500 tons. In the early part of 1915 a strong effort was made to have these rates reduced and on April 27, 1915, an act of the legislature was approved reducing the charges to $2 per foot draft and 2 cents per register ton.

Pilotage is compulsory and must be paid by every vessel spoken, inward or outward bound, except vessels under enrollment and licensed and engaged in the coasting trade between San Francisco and other United States ports and vessels engaged in the whaling and fishing trades, which shall be exempt from all pilotage unless a pilot is actually employed. In all cases where inward-bound vessels are not spoken until inside of the bar the rates are reduced one-half.[a]

*Towage.*—Rates for towage are fixed by towboat owners, the board of State harbor commissioners having no jurisdiction over towage charges. The following list contains the prevailing towage rates:

| Net register tonnage of vessels. | From stream to— | | | | | | | Extra to light-ship. |
|---|---|---|---|---|---|---|---|---|
| | City front. | Oakland Wharf or refinery. | Oakland Creek. | Sea, with hawser. | Point Richmond. | Point San Pablo. | Port Costa. | |
| 350 to 450 | $12.50 | $15.00 | $22.50 | $30.00 | $25.00 | $30.00 | $45.00 | $20.00 |
| 450 to 550 | 12.50 | 15.00 | 25.00 | 35.00 | 30.00 | 35.00 | 50.00 | 25.00 |
| 550 to 650 | 15.00 | 20.00 | 30.00 | 40.00 | 35.00 | 37.50 | 52.50 | 25.00 |
| 650 to 750 | 15.00 | 20.00 | 30.00 | 45.00 | 37.50 | 40.00 | 55.00 | 25.00 |
| 750 to 850 | 17.50 | 22.50 | 35.00 | 50.00 | 40.00 | 42.50 | 57.50 | 25.00 |
| 850 to 950 | 20.00 | 25.00 | 40.00 | 55.00 | 42.50 | 45.00 | 62.50 | 25.00 |
| 950 to 1,050 | 20.00 | 25.00 | 40.00 | 55.00 | 45.00 | 47.50 | 65.00 | 25.00 |
| 1,050 to 1,150 | 22.50 | 27.50 | 45.00 | 55.00 | 47.50 | 50.00 | 67.50 | 25.00 |
| 1,150 to 1,250 | 22.50 | 27.50 | 45.00 | 60.00 | 47.50 | 50.00 | 70.00 | 25.00 |
| 1,250 to 1,350 | 25.00 | 30.00 | 45.00 | 60.00 | 50.00 | 55.00 | 72.50 | 25.00 |
| 1,350 to 1,450 | 25.00 | 30.00 | 50.00 | 65.00 | 50.00 | 55.00 | 72.50 | 25.00 |
| 1,450 to 1,550 | 25.00 | 35.00 | 50.00 | 65.00 | 55.00 | 60.00 | 75.00 | 25.00 |
| 1,550 to 1,650 | 25.00 | 35.00 | 55.00 | 65.00 | 55.00 | 60.00 | 80.00 | 25.00 |
| 1,650 to 1,800 | 25.00 | 35.00 | 55.00 | 70.00 | 60.00 | 65.00 | 85.00 | 25.00 |

*Harbor dues.*—There are no harbor dues at the port of San Francisco.

*Dockage.*—Vessels of less than 200 net register tons pay 2 cents per ton for dockage, while vessels of more than 200 tons must pay $4 for the first 200 tons and three-quarters of a cent for each additional ton. These rates are for a day of 24 hours or any part thereof.

Half rates are charged vessels while loading cargo, lying idle, or undergoing repairs, or while taking on passengers or receiving supplies or fuel. In no case, however, are vessels engaged in towing and those that do not carry freight and passengers entitled to half rates.

*Wharfage.*—The general rate of wharfage on merchandise is 5 cents per ton. In the case of pig iron, coal, and other minerals the ton is taken as 2,240 pounds, and in the case of other commodities

[a] Biennial Report, Board of State Harbor Commissioners for 1913 and 1914, p. 104.



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at 2,000 pounds or 40 cubic feet according to the greater number of tons.

Wharfage on a number of commodities is charged otherwise than by the ton, as is indicated in the following statement:

| Commodities. | Charges. | Commodities. | Charges. |
|---|---|---|---|
| Lumber: | | Cattle, horses, and mules.....each.. | $0.05 |
| Softwood.....per 1,000 feet b. m.. | [a] $0.10 | Calves and colts.....do.... | .075 |
| Hardwood.....do.... | [a] .20 | Sheep and hogs.....do.... | .01 |
| Piles.....each.. | [b] .06 | Hay.....short ton.. | .10 |
| Fence posts.....per 100.. | .10 | Crushed rock.....long ton.. | .05 |
| Railroad ties.....per 1,000 feet b. m.. | [c] .10 | Agricultural implements: [e] | |
| Shingles.....per 40 bundles.. | .10 | Headers and separators.....each.. | .20 |
| Laths.....per 60 bundles.. | .10 | All other.....do.... | .10 |
| Shakes.....per 100 bundles.. | .10 | Charcoal.....per 35 sacks [f].. | .05 |
| Empty barrels.....each.. | .0025 | Cement, lime.....per ton [g].. | .05 |
| Cordwood.....per cord.. | .05 | Beef, pork, fish.....do.[h].... | .05 |
| Tan bark and stave bolts.....do.... | .05 | Sugar, sirup.....do.[h].... | .05 |
| Bricks: | | Wine, liquor.....per barrel.. | .0125 |
| Fire.....per 1,000.. | [d] .15 | Do.....per pipe.. | .05 |
| All other.....do.... | [d] .10 | Coconuts.....per 1,000.. | [i] .15 |
| Wool or cotton: | | Bananas.....per bunch.. | .0025 |
| In sacks.....per sack.. | .01 | Salmon.....per short ton.. | .05 |
| In bales, strapped.....per bale.. | .015 | Crude oil, naphtha, gasoline, per short ton [j] | .05 |
| Hops.....do.... | .01 | Copra.....per ton [k].. | .06 |
| Hides.....each.. | .0025 | | |
| Skins.....do.... | .00½ | | |

[a] Whether discharged on wharf or in water.
[b] If discharged in water.
[c] Twenty-four or thirty-two feet per tie, according to size.
[d] Rate is only 50 per cent of this amount, if brick is received from or discharged directly into another vessel.
[e] Set up.
[f] Of 55 pounds each.
[g] Five barrels to ton in case of cement and eight barrels to ton for lime.
[h] Six barrels to ton.
[i] Ten cents if husked.
[j] To be computed at rate of 7⅞ pounds to gallon.
[k] By measurement.

*Switching.*—Although the Belt Railroad is now one continuous line, the service is still divided into two divisions, the northern and the southern, the dividing line being Market Street. The following is a list of switching charges:

| | Per car. |
|---|---|
| 1. Moving loaded cars from a place in one division to another place in the same division | $2.50 |
| 2. Moving loaded cars from a place in one division to a place in another division. No charge is made for moving empty cars, either to be loaded or after unloading, when incidental to operations embraced in items 1 and 2, respectively. | 5.00 |
| 3. Moving empty freight cars from place to place within same division for loading or on order of shipper or railroad, and not loaded but returned empty to place within same division | 1.50 |
| 4. Moving empty freight cars from a place in one division to a place in the other division for loading on order of shipper or railroad and not loaded but returned empty: | |
| If it crosses Market Street once in the entire operation | 1.50 |
| If it crosses Market Street twice in the entire operation | 4.50 |
| 5. Moving empty freight cars from one division to another division on order of shipper or railroad, but not for loading as a part of the operation | 2.00 |
| 6. Moving empty passenger cars between any two points on the Belt Railroad. | 10.00 |
| 7. For use of team track and storage tracks for each 24 hours or part thereof... Cars loaded or empty remaining on any Belt Railroad track over 24 hours after delivery is tendered by the Belt Railroad will be charged storage for each 24 hours or part thereof | 2.50<br>2.00 |
| 8. Moving loaded baggage or express cars (such cars will be returned empty as part of the same movement without charge, provided that all movements of such cars are at the risk of owners) | 5.00 |

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*Rents.*—One of the distinctive charges at the port of San Francisco is that made for preferential assignment of berths and of space in sheds at the State piers. Agreements are entered into between the harbor board and steamship lines whereby the latter may enjoy the use of definite berthing and pier-shed space, but only while their vessels are in port. These agreements are in the form of leases from month to month. Formerly the rental was based on the running foot, the charge being 50 cents per foot. Since this rate applied to all piers regardless of their widths and of their condition and equipment, it was found to be inequitable and a new system of charges was instituted. This system is based on pier area and provides a charge of $0.012 per square foot per month for assignments at piers built since March, 1911, and of $0.009 per square foot per month for assignments of piers built before that time.

The charge made for preferential assignment of pier, it should be understood, is in addition to the charge for dockage against the vessel and for tolls against the cargo.

At San Francisco it is difficult to determine the total port charges paid per ton of cargo handled for the reason that at least three items enter into the combined port charge, namely, rent of wharf, dockage, and toll.

At the Conference of Port Authorities of the Pacific Coast, held in Seattle in June, 1914, Mr. John H. McCallum, member of the Board of State Harbor Commissioners, submitted figures compiled from the board's records for 1913, covering the rent, dockage, and tolls paid and the tons of freight handled by four of the principal steamship companies using the wharves at San Francisco, and from these cost and tonnage figures were derived the port charges per ton of freight handled by each company. The complete figures are as follows:

| Lines. | Cargo handled. | Port charges paid. | | | | Port charges per ton of cargo. |
|---|---|---|---|---|---|---|
| | | Rent. | Dockage. | Tolls. | Total. | |
| | *Tons.* | | | | | |
| Alaska Pacific Steamship Co | 119,256 | $3,542.40 | $2,825.10 | $5,962.82 | $12,330.32 | $0.103 |
| Pacific Coast Steamship Co | 383,228 | 18,298.80 | 15,234.80 | 19,161.41 | 52,965.01 | .137 |
| North Pacific Steamship Co | 94,666 | 1,758.00 | 6,651.36 | 4,733.28 | 13,142.64 | .139 |
| San Francisco & Portland Steamship Co | 119,370 | 7,200.00 | 6,136.65 | 5,968.45 | 19,305.10 | .161 |

## SEATTLE, WASH.

Seattle is located on Elliott Bay, an arm of Puget Sound, about 138 miles from Cape Flattery. The city covers practically the entire shore of the bay and "has spread northward to include Ballard, eastward to Lake Washington, southward around the head of Elliott Bay, and westward to embrace West Seattle and the east shore of the Sound to and beyond Alki Point." [a]

Elliott Bay proper—that is, between Magnolia Bluff and Duwamish Head—has a width of nearly 2 miles and has deep water throughout. The United States Coast and Geodetic Survey reports that "the depths in the bay are excessive and preclude anchorage except at a few places close inshore." [a]

[a] Coast Pilot, Pacific Coast, 1909 edition, p. 153.

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The port of Seattle comprises, as indicated in the birdseye view of the port shown opposite page 307, an outer, or salt water, harbor and an inner, or fresh water, harbor. The outer harbor includes frontage on Elliott Bay, East Waterway, West Waterway, Duwamish Waterway, Smith Cove Waterway, and Shilshole Bay.

Elliott Bay, which accommodates the major part of the shipping of the port, has a shore line of 9 miles from Duwamish Head to a point opposite at the foot of Magnolia Bluff and a surface orea of 3,800 acres.

East Waterway is a channel 1,000 feet wide and 1½ miles long that has been excavated in the shallow tide flats at the mouth of the Duwamish River. This waterway has a depth of 35 feet.

West Waterway is 1,000 feet in width and about 1 mile in length, and it also has been excavated from the tide flats at the mouth of the Duwamish River.

The Duwamish Waterway is being dredged through the valley of the Duwamish River. The channel will be 4 miles long, 300 feet wide at the surface, 150 feet wide at the bottom, and 16 feet deep. This improvement is being made by the Duwamish Waterway Commission, created for this purpose. The estimated cost will be $1,600,000, for which $600,000 has been appropriated by the county (King) and the balance by the district benefited by the improvement.

Smith Cove Waterway is 400 feet in width and 2,320 feet in length.

Shilshole Bay, which is the portion of Salmon Bay and the channel of Lake Washington Canal west of the locks, is one-half mile long.

The inner harbor includes the portion of Salmon Bay east of the Lake Washington Canal Locks, the portion of the Government ship canal connecting Lake Union with Puget Sound, Lake Union, and Lake Washington.

Salmon Bay is a tidal slough between Lake Union and Puget Sound. The level of this stretch of water will be raised by the Government lock and dam to the level of Lake Union.

Lake Union is a small body of fresh water located in the center of the city. This lake has a shore line of 7 miles and an average depth of 7 fathoms.

Lake Washington is a body of fresh water lying along the eastern limits of the city. It is 20 miles long and from 1½ to 4 miles wide and its depth ranges from 48 feet at a distance of a cable length from shore to 222 feet at the center of the lake. It is free from shoals or other obstructions. The level of this lake will be lowered to that of Lake Union by the construction of the Government lock and dam.

The Government ship canal referred to will extend from Puget Sound to Lake Washington via Lake Union. The depth of this canal from Puget Sound to Lake Union will be 35 feet and from Lake Union to Lake Washington 25 feet. This canal is being built by the Federal Government, the State of Washington, and King County jointly. The Federal Government has appropriated $2,625,000 for the construction of the canal from Shilshole Bay to the narrows in Salmon Bay, a distance of 7,150 feet, and for building the locks. The canal from the narrows in Salmon Bay to Lake Union and between Lake Union and Lake Washington, a distance of 13,200 feet, is being constructed by the State and King County jointly at the cost of more than $1,500,000. The canal will have one large and one small lock. The larger lock will be 825 feet long and 80 feet wide; the smaller lock, 125 feet long and 30 feet wide. The locks will have a depth of 35 feet and will be parallel to each other.

The inner harbor will be extended also by the completion of the Renton Waterway and the Sammamish Waterway, which are now being improved, and will extend to flats at the south and north ends of Lake Washington, respectively.

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The Renton Waterway is a channel about 1 mile in length which has been excavated for the purpose of diverting Cedar River into Lake Washington and for providing a water route to the town of Renton, which contains several coal mines and a number of manufacturing plants. This waterway has cost $100,000, the county as a whole providing $50,000 and a special assessment district $50,000.

The Sammamish Waterway connects Lake Sammamish and Lake Washington, and at present is merely a drainage canal. It may, however, be widened and deepened and be made available for the use of small boats and barges.

**Railroads.**—Seattle is served by four transcontinental railroads that enter the city over their own rails, namely, the Chicago, Milwaukee & St. Paul, the Great Northern, the Northern Pacific, and the Union Pacific (Oregon-Washington Railroad & Navigation Co.) Railroads. Two other trunk line railroads, the Canadian Pacific and the Chicago, Burlington & Quincy, enter the city over the rails of the Northern Pacific Railway. A local line, the Columbia & Puget Sound Railroad, connects near-by coal fields with the city of Seattle and the water front.

No single or coordinated marginal railway is to be found at the port of Seattle, but there is practically a complete system around the entire harbor front which is made up of tracks of the several railroads laid along the marginal thoroughfares. Complaint, however, has been made that there is a lack of proper coordination of rail facilities on the water front. The port commission has built public rail spurs on each of the six public terminals and has secured a franchise for a belt-line railroad extending from the southern extremity of the East Waterway to Washington Street. It is expected that several miles of this belt line will be constructed in the near future.

**Steamship lines.**—The following is a list of the principal lines of steamships engaged in foreign trade that call regularly at the port of Seattle:

| Lines. | Sailings. | Ports or countries of destination. |
|---|---|---|
| American-Hawaiian Steamship Co. | 1 every 11 days. | Honolulu, Hilo, Kahului. |
| Bank Line<br>Blue Funnel Line<br>Great Northern Steamship Co.<br>Ocean Steamship Co. (Ltd.)<br>Weir Steamship Line<br>Frank Waterhouse & Co. (Ltd.) | 4 to 7 monthly [a] | Yokohama, Kobe, Moji, Nagasaki (Japan), Shanghai and Hongkong (China), Manila. |
| Blue Funnel Line | 1 every 4 weeks | Liverpool, etc., via Japan, China, Straits Settlements, Suez Canal. |
| Danish East-Asiatic Co | 1 monthly | West coast of South America, Europe. |
| W. R. Grace & Co.'s Merchants' Line | 2 monthly | Mexico, Central America, Ecuador, Peru, Chile. |
| Hamburg-American Line | 1 monthly | Japan, China, Philippines, Straits Settlements. |
| Harrison Direct Line | do | Swansea, Dunkirk, London, etc. |
| Kosmos Line [b] | 2 monthly | Central and South America, Europe. |
| Maple Leaf Line | 1 monthly | Great Britain and Continent. |
| Matson Navigation Co | 2 monthly | Honolulu, Hilo. |
| Royal Mail Steam Packet Co. | 1 monthly | Japan, China, Philippines, Straits Settlements. |

[a] Operate a joint service in connection with the Great Northern and the Northern Pacific Railroads.
[b] Service suspended on account of the war in Europe.

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The following is a list of the principal coastwise and local sound lines that call regularly at the port of Seattle:

| Lines. | Sailings. | Ports of destination. |
|---|---|---|
| Alaska Coast Steamship Co | 3 monthly | Alaskan ports. |
| Alaska Pacific Steamship Co | 2 weekly | San Francisco. |
| Alaska Steamship Co | 1 every 3 days | Alaskan ports. |
| American-Hawaiian Steamship Co | 1 every 4 days | New York and ports on Pacific coast. |
| Atlantic & Pacific Steamship Co | 1 every 3 weeks | New York. |
| Border Line Transportation Co | 2 weekly | Alaskan ports. |
| Canadian Pacific Ry. Steamship Lines | 2 daily | Vancouver and Victoria. |
| Grand Trunk Pacific Steamships | 3 weekly | Vancouver, Victoria, and Prince Rupert. |
| Humboldt Steamship Co | 1 every 10 days | Alaskan ports. |
| Matson Navigation Co | 1 every 3 weeks | Do. |
| Pacific Coast Steamship Co.[a] | 2 weekly | Victoria, San Francisco, Los Angeles, and San Diego. |
| Puget Sound Navigation Co | 1 daily, except Sunday.[b] | |

[a] Operates a service also between Seattle and Alaskan ports.
[b] One round trip daily, except Sunday, to Port Townsend and Bellingham, Wash., Victoria, and intermediate points; to Neah Bay and intermediate points; to Point Angeles; to Bellingham and intermediate points; to points on Hood Canal; in addition to eight round trips daily to Tacoma, three to Everett, and nine to Bremerton.

**Commerce of the port.**—The water-borne commerce of the port of Seattle, exclusive of Ballard Harbor and the traffic on Lakes Washington and Union, in the calendar year 1913, was valued at $123,237,299. Complete tonnage figures are not available, but it is estimated that more than 3,000,000 short tons of freight were handled in that year.

The value of the receipts from both domestic and foreign ports was $64,002,384. The principal receipts were as follows: "Merchandise," $29,836,529; raw silk, $14,472,495; salmon, $5,967,962; sugar, $1,960,508; logs, $1,794,916; tea, $1,382,452; halibut, $1,334,795; camphor, $974,984; hemp, $950,946; braid, $746,989.

The shipments to both domestic and foreign ports were valued at $59,234,915 and included the following principal commodities: "Merchandise," $33,298,253; flour, $5,112,283; salmon, $3,990,175; raw cotton, $2,432,635; wheat, $1,994,061; meats, $1,315,451; machinery, $1,258,122; lumber, $1,125,638; coal, $1,005,803; canned milk, $917,607.

The traffic on Lake Washington amounted to 122,839 short tons, valued at $1,269,713; that on Lake Union, to 75,456 short tons, valued at $347,215. The traffic on both lakes consisted almost entirely of logs, lumber and other timber products, coal, sand, and gravel. The same is true of the commerce at Ballard Harbor, which amounted to 510,034 short tons, valued at $2,635,328.

**Extent and ownership of water front.**—The extent of the water frontage now available in the several portions of Seattle Harbor is shown in the following table:[a]

[a] Compiled from a table presented at pp. 54–55 of the Port of Seattle Yearbook for 1914.

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| Sections of harbor. | Length of shore line. | | |
|---|---|---|---|
| | Developed. | Capable of development. | Total. |
| **Outer harbor:** | *Feet.* | *Feet.* | *Feet.* |
| Elliott Bay | 19,240 | 31,960 | 51,200 |
| East Waterway | 4,500 | 9,400 | 13,900 |
| West Waterway | 3,200 | 8,800 | 12,000 |
| Smith's Cove Waterway | 3,300 | 1,940 | 4,640 |
| Shilshole Bay | ..... | 5,400 | 28,000 |
| Duwamish Waterway | 500 | 46,500 | 47,000 |
| Total | 30,740 | 103,500 | 156,740 |
| **Inner harbor:** | | | |
| Salmon Bay | 10,400 | 13,100 | 17,600 |
| Lake Union | 3,000 | 29,600 | 37,600 |
| Lake Washington: | | | |
| Main land | 2,850 | 136,000 | 308,800 |
| Mercer Island | 500 | 1,000 | 64,800 |
| Lake Washington Canal | 1,000 | 5,700 | 15,800 |
| Total | 17,750 | 185,400 | 444,600 |
| Grand total | 48,490 | 288,900 | 601,340 |

All the frontage shown in the above table is privately owned except 11,500 feet owned by the port district and 500 feet owned by the city. Railroad companies own 27,200 feet; steamship companies, 3,200 feet; wharf and dock companies, 2,700 feet; industrial companies, about 16,000 feet; and various other private interests, the remainder.

**Terminals.**—While the number of public terminals at the port of Seattle is much less than at the ports of New Orleans and San Francisco, this port has nevertheless made such rapid strides in public ownership and operation of port facilities that it must be now ranked among the principal ports of the country in this respect. In one important particular the port of Seattle is now foremost, that is, in the extent and variety of warehouse facilities, although New Orleans, with the new cotton warehouse that is under construction and the grain elevator that is under construction, will be a close rival.

The following table contains a list of the public wharves which were built by and are under the control of the Port of Seattle, with the dimensions, area, character of construction, and primary use of each:

| Wharves. | Berthage space. | Length. | Width. | Area. | Character of construction.[a] | Primary use. |
|---|---|---|---|---|---|---|
| Stacy-Lander: | *Feet.* | *Feet.* | *Feet.* | *Sq. ft.* | | |
| No. 1 | 2,310 | 800 | 112 | 89,600 | Type A | General cargo. |
| No. 2 | | 800 | 112 | 89,600 | .....do | Do. |
| Hanford Street | 1,480 | 1,480 | 122 | 142,160 | .....do | Do. |
| Smiths Cove | 3,698 | 2,530 | 310 | 784,300 | Type B | Lumber and heavy freight. |
| Salmon Bay | 1,260 | 500 | 300 | 150,000 | Type C | Fishing fleet. |
| Bell Street | 1,150 | 802 | 90 | 72,180 | Type A | General cargo. |
| Spokane Street | 1,255 | 1,255 | 113 | 141,815 | .....do | Do. |

[a] Type A, creosoted pile and timber; Type B, solid filled pier; Type C, untreated pile and timber.

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The following table shows the dimensions, height, floor space, and character of construction of the transit, or wharf, sheds, and of the warehouses:

| Transit sheds and warehouses. | Length. | Width. | Height. | Floor space. | Character of construction.[a] |
|---|---|---|---|---|---|
| Transit sheds: | *Feet.* | *Feet.* | *Stories.* | *Sq. ft.* | |
| Bell Street Wharf | 800 | 70 | 2 | 112,000 | Type A. |
| Stacy-Lander Wharves— | | | | | |
| No. 1 | 730 | 90 | 1 | 65,700 | Do. |
| No. 2 | 750 | 90 | 1 | 70,200 | Do. |
| Hanford Street Wharf | 780 | 90 | 2 | 140,400 | Do. |
| | 330 | 80 | 1 | 26,400 | Do. |
| Smiths Cove | 600 | 97 | 1 | 67,200 | Do. |
| | 600 | 97 | 1 | 67,200 | Do. |
| Warehouses: | | | | | |
| Bell Street | 422 | 80 | 4-5 | 110,584 | Type B. |
| Whatcom Avenue | 320 | 78 | 4 | 99,840 | Do. |
| Spokane Avenue, No. 1 (fruit storage) | 195 | 147 | 7 | 149,105 | Do. |

[a] Type A, timber frame sheathed on the outside with shiplap and covered with corrugated ingot iron; Type B, reinforced concrete.

The Bell Street transit shed is equipped with three Barlow marine elevators designed to facilitate loading out of side ports of vessels and depositing cargo on the first or second floors of transit shed, one bag chute from second to first floor, and public tracks on the face and rear of the shed. On the north end a protected motor-boat basin is provided for mooring small boats.

Immediately in the rear of the transit shed is located the Bell Street public warehouse. The north end of this warehouse is five stories high, with a floor area of 19,920 square feet, and is equipped with a modern cold-storage plant. The south end of the warehouse is four stories high, three floors, with a floor area of 41,480 square feet, being used for general storage, while the fourth floor is used in part for the general offices of the port commission. The warehouse is connected with the second floor of the transit shed by bridges and is equipped with five freight elevators and one passenger elevator. The warehouse has spur tracks in the front and rear and has connections with the Chicago, Milwaukee & St. Paul, the Great Northern, and the Northern Pacific Railway tracks in Railroad Avenue.

The Whatcom Avenue public warehouse is located at the head of the slip between Stacey and Lander Street Piers, which are occupied by the American-Hawaiian Steamship Co. The warehouse is four stories high and has a floor area of 41,479 square feet. The warehouse and transit sheds are served by public spur-track connection with the rails of the Chicago, Milwaukee & St. Paul and the Oregon-Washington Railway & Navigation Co. The warehouse is equipped with three electric elevators of 4-ton and 6-ton capacity, two spiral chutes, one electric vertical conveyor, and several portable gravity conveyors. Storage-battery trucks are in use for handling cargo between the wharf and the warehouse.

The Spokane Street warehouse has been designed for use ultimately as a fruit-storage warehouse, but will be used at the outset for salmon or wheat storage. Adjacent to this warehouse, a fish cold-storage warehouse of 2,000,000 pounds capacity and a refrigerating and ice-making plant have been authorized, but construction at present is

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held up by court injunction. These warehouses will be served by public spurs with connections to the railroads in Whatcom Avenue and later also by the Port Commission Belt Line Railroad.

The public grain elevator is located near Hanford Street and Whatcom Avenue and is of reinforced-concrete construction. The working house measures 36 by 72 feet and is 173 feet high. The storage annex is 95 by 95 feet square, containing 25 circular and 16 interstice bins with a storage capacity of 500,000 bushels. Ships can be loaded by belt conveyor at the rate of 20,000 bushels per hour. In addition, the elevator is equipped with all the up-to-date machinery, which makes it one of the most modern elevators in this country. Ample trackage is provided by means of connections with the railroads in Whatcom Avenue.

Smith's Cove pier is equipped with an electric gantry crane of the double-cantilever type which has a length over-all of 201 feet and a range of travel along the wharf of about 850 feet. Lumber can be handled direct from cars or storage yard to hold of ship in units of 1,500 feet board measure. The crane can also handle structural steel, etc., up to 5 tons. The pier is also equipped with a 15-ton traveling locomotive crane and a 100-ton electric steel derrick for handling heavy material. A clamshell bucket is also provided for handling coal, gravel, etc. The pier has about 3 miles of track.

The port district has a considerable area of property near the water front which is available for industrial sites. The following description of the property appeared in a recent annual report of the port commission:

The Canal Waterway, extending from the west line of Whatcom Avenue to the west line of Ninth Avenue south, was vacated on April 17, 1914, by order of the State land commissioner and title vested in the port district in conformity with the provisions of Chapter 171, Session Laws, 1913. This canal was 300 feet in width and 1 mile in length, lying between Spokane and Hanford Streets, crossed by every railroad reaching Seattle. It was platted by the port commission into 18 industrial blocks, 200 feet long and of varying width, north and south streets being extended and two 50-foot streets east and west laid out for traffic access to the new public terminals at the head of East Waterway. (Vol. 21, p. 21, King County Record of Plats.) These blocks were offered for lease on 15-year term, at an annual rental of 5 per cent on the present appraised value, with reappraisal each 5 years. Block 1 was leased to the Stetson & Post Lumber Co. at $365 per month, being 5 per cent on 81 cents per square foot of value and Block 5 was taken by the Cumberland Coal Co. at 62½ cents per square foot of value. The area and a low estimate of present value of the Canal Waterway blocks are as follows:

| Blocks. | Area. | Value per square foot. | Total value. | Annual rental at 5 per cent. | Blocks. | Area. | Value per square foot. | Total value. | Annual rental at 5 per cent. |
|---|---|---|---|---|---|---|---|---|---|
| | *Sq. ft.* | | | | | *Sq. ft.* | | | |
| 1 | 107,600 | $0.81 | $87,156.00 | $4,357.80 | 11 | 54,000 | $0.65 | $35,100.00 | $1,755.00 |
| 2 | 29,000 | .70 | 20,300.00 | 1,015.00 | 12 | 54,000 | .60 | 32,400.00 | 1,620.00 |
| 3 | 29,000 | .70 | 20,300.00 | 1,015.00 | 13 | 24,000 | .55 | 13,200.00 | 660.00 |
| 4 | 29,600 | .70 | 20,720.00 | 1,036.00 | 14 | 24,000 | .50 | 12,000.00 | 600.00 |
| 5 | 30,000 | .62½ | 18,750.00 | 937.50 | 15 | 24,000 | .50 | 12,000.00 | 600.00 |
| 6 | 24,400 | .65 | 15,860.00 | 793.00 | 16 | 24,000 | .50 | 12,000.00 | 600.00 |
| 7 | 24,400 | .65 | 15,860.00 | 793.00 | 17 | 23,000 | .55 | 12,650.00 | 632.50 |
| 8 | 27,580 | .60 | 16,548.00 | 827.40 | 18 | 22,702 | .65 | 14,756.30 | 737.82 |
| 9 | 27,580 | .60 | 16,548.00 | 827.40 | | | | | |
| 10 | 30,000 | .65 | 19,500.00 | 975.00 | Total | 608,862 | | 395,648.30 | 19,782.42 |

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*Private terminals.*—The following table contains a list of the principal privately-owned terminals, with the linear frontage, wharf area, and shed area of each:

| Owners. | Number of wharf. | Size of wharves. | | Area of wharf sheds. |
|---|---|---|---|---|
| | | Frontage. | Area. | |
| | | *Feet.* | *Sq. feet.* | *Sq. feet.* |
| Railroad companies: | | | | |
| Chicago, Milwaukee & St. Paul | 13 | 200 | (a) | (a) |
| | 14 | 800 | (a) | (a) |
| | 42 | 866 | 71,000 | 44,200 |
| Columbia & Puget Sound | 26 | 750 | (a) | (a) |
| | 32 | 886 | 27,874 | 23,100 |
| Canadian Pacific | 33 | 1,820 | (a) | 66,000 |
| Grand Trunk | 37 | 1,330 | 79,000 | 46,000 |
| Northern Pacific | 54 | 688 | 15,000 | (a) |
| Great Northern | 61 | 1,590 | 179,784 | 120,200 |
| | 62 | 1,330 | 85,447 | 71,200 |
| Steamship companies: | | | | |
| Alaska Steamship Co | 34 | 1,675 | (a) | 58,000 |
| Dodwell & Co | 45 | 1,020 | 122,000 | 28,800 |
| Pacific Coast Steamship Co | 29 | 1,356 | 106,165 | 72,380 |
| | 31 | 924 | 49,352 | 38,000 |
| Wharf and dock companies: | | | | |
| Arlington Dock Co | 40 | 787 | (a) | 19,200 |
| | 41 | 835 | (a) | 62,000 |
| Ainsworth & Dunn | 55 | 1,060 | 96,000 | 43,000 |
| Colman Dock | 35 | 1,440 | (a) | (a) |
| Galbraith, Bacon & Co | 39 | 790 | 44,100 | 68,100 |
| | 50 | 1,055 | 73,360 | 51,900 |
| C. H. Lilly | 30 | 805 | 38,000 | 30,880 |
| Oriental Dock & Warehouse Co | 48 | 711 | 57,125 | 37,698 |
| Schwacher Dock & Warehouse Co | 44 | 920 | 55,610 | 27,200 |
| Virginia Street Dock & Warehouse Co | 47 | 983 | 89,375 | 65,270 |
| Flour mills and grain elevators: | | | | |
| Alber Brothers Milling Co | 20 | 497 | 350,000 | (a) |
| Centennial Milling Co | 22 | 620 | 18,000 | (a) |
| Fisher Flouring Mill | 11 | 1,200 | (a) | 9,500 |
| Hammond Milling Co | 19 | 559 | 25,000 | (a) |
| Novelty Milling Co | 7 | 269 | 1,200 | 6,944 |
| West Seattle Elevator | 8 | 1,199 | (a) | 14,000 |
| Lumber docks, sawmills, etc.: | | | | |
| Colman Creosoting Works | 9 | 500 | 160,400 | 160,400 |
| | 58 | 1,346 | (a) | (a) |
| Schwager & Nettleton | 10 | 800 | 48,100 | (a) |
| Seattle Lumber Co | 60 | 820 | 15,960 | (a) |

a Not reported.

In addition to the wharves shown in the above table there are six wharves occupied by shipbuilding and repair companies, two by coal companies, two by oil companies, four by fish companies, and three by sand and gravel companies.

**Type of wharf construction.**—The depth of water close to shore precludes the building of long piers. Consequently the prevailing type of construction is that of longitudinal wharves parallel to the shore. Creosoted piles and timber are the materials generally used.

**Port administration.**—The port of Seattle has a port organization that is unique in the United States. Port affairs are administered by a separate and independent municipal corporation created by the port district act of the State legislature, approved March 14, 1911. Because of the novel features of this act the following summary [a] will be of interest:

Sections 1, 2, and 3, and new section 3½ are devoted to the machinery for the creation of the port district and the election of commissioners. Districts are created by popular election, called by the county commissioners of the county in which the district is to be located upon the petition of a specified number of voters, setting forth the same as or less than the territory of the county. In each port district there are three commis-

[a] Bulletin No. 3, Port of Seattle Commission, May 1, 1913.

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sioner districts and one commissioner is elected from each district. In any district of over 80,000 population there may be five commissioners if the district so decides by vote, in which case two are to be chosen at large from the entire district, the others being chosen one from each commissioner district. Each commissioner serves three years and one commissioner retires each year in districts where there are only three commisioners. In districts in which there are five, the commissioners at large likewise alternate in retirement.

Section 4 of the act specifies in great detail the powers of the port district, which are extremely comprehensive, embracing everything essential to the efficient execution of work pertaining to the port. These include the right of acquisition of lands by eminent domain; of collecting taxes and assessments; of issuing bonds (sanctioned by vote of the district); of constructing all manner of works essential to port development; of establishing local improvement districts; of fixing rates of wharfage, etc.; of leasing wharves, docks, and other properties; and a variety of other powers which it is not necessary here to specify.

Section 5 defines the powers of port commissioners in regard to the management of their work, gives them the right to create and fill positions and fix the salaries thereof, and specifies the method of execution of work, particularly when done by contract.

Sections 6 and 7 require that before commencing any work a comprehensive plan of improvement shall be adopted and approved by the people; and that such plans shall be followed, unless subsequently changed by a majority of the voters of the district.

Section 8 relates to the ownership of port properties within port districts.

Section 10 provides the method of organizing local assessment districts. Other sections regulate minor details.

The port district of Seattle is coterminous with King County, of which the city of Seattle is the county seat, and is independent of State, county, or municipal control.

The governing body of the port district is known as the port commission. The Port of Seattle Commission consists of three members elected by popular vote for terms of three years, so arranged that one commissioner retires every year. This arrangement of terms precludes sudden changes in port policy. The commissioners serve without compensation.

Upon organization the commission elects one of its members president and another secretary. The board has one stated meeting weekly and a number of special meetings.

The staff of the commission is divided into four divisions, as follows: (1) The secretary's division, consisting of an assistant secretary and two clerks; (2) the engineering division, consisting of a chief engineer, three assistant engineers, and 15 other assistants; (3) the accounting and purchasing division, consisting of one auditor and one regular assistant; (4) the legal division; and (5) the operating division, which is under the control of the assistant secretary and traffic manager, and consists of one agent at each of the six public terminals, one wharfinger, one warehouseman, one elevator superintendent, one foreman of cold-storage warehouse, one night watchman, freight checkers, and others.

Another port official, the port warden, is appointed by the mayor, and acts independently of the port commission. The principal duty of the port warden is to enforce the harbor rules and regulations passed by the city council, but he is also required to collect mooring, dockage, and wharfage charges at several street and floats and city buoys, to "collect and compile complete and accurate statistics of the movements and tonnage of vessels, passengers, and cargo," and to report any of the piers and wharves needing repairs.[a]

Funds for harbor construction and improvement are provided by bonds voted by the people of the port district. Bond issues must be

[a] Ordinance No. 31268.

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approved by a three-fifths majority of the votes cast. The bonded indebtedness of the port commission must not exceed 3 per cent of the taxable value of all property in the district. The commission may also secure funds by means of annual tax levies but the levy can not exceed 2 mills in any one year.

**Port charges.**—*Pilotage.*—Pilotage is not compulsory in Puget Sound, since all steamers and many sailing vessels can enter without the aid of a special pilot. All foreign steamships, however, employ regular pilots on either a salary or a contract basis. The charge for pilotage from Port Townsend to Seattle and return ranges from $100 to $150. Port Townsend is 38 miles from Seattle and can be reached by all vessels under their own steam or sail.

*Towage.*—The following is a list of the rates of towage from Cape Flattery, Port Townsend, and Port Angeles to Seattle, as fixed by the Puget Sound Tow Boat Owners' Association:

| Class and net register tonnage of vessels. | Charge for towage between Seattle and— | | | Class and net register tonnage of vessels. | Charge for towage between Seattle and— | | |
|---|---|---|---|---|---|---|---|
| | Cape Flattery. | Port Townsend. | Port Angeles. | | Cape Flattery. | Port Townsend. | Port Angeles. |
| Single-deck vessels: | | | | Double-deck vessels: | | | |
| 150–250 | $95.00 | $30.00 | $55.00 | 851–1,000 | $250.00 | $100.00 | $150.00 |
| 251–350 | 115.00 | 40.00 | 70.00 | 1,001–1,200 | 275.00 | 110.00 | 175.00 |
| 351–450 | 135.00 | 50.00 | 85.00 | 1,201–1,500 | 300.00 | 125.00 | 200.00 |
| 451–500 | 145.00 | 55.00 | 90.00 | 1,501–1,800 | 325.00 | 150.00 | 225.00 |
| 501–550 | 155.00 | 60.00 | 100.00 | 1,801–2,000 | 350.00 | 175.00 | 250.00 |
| 551–600 | 165.00 | 65.00 | 108.00 | 2,001–2,500 | 375.00 | 200.00 | 275.00 |
| 601–650 | 175.00 | 70.00 | 115.00 | 2,501–2,750 | 400.00 | 225.00 | 300.00 |
| 651–700 | 185.00 | 75.00 | 123.00 | 2,751–3,000 | 425.00 | 250.00 | 325.00 |
| 701–750 | 195.00 | 80.00 | 130.00 | 3,001–3,500 | 450.00 | 275.00 | 350.00 |
| 751–850 | 230.00 | 90.00 | 140.00 | | | | |
| 851–1,000 | 250.00 | 100.00 | 150.00 | | | | |
| 1,001–1,200 | 275.00 | 110.00 | 175.00 | | | | |
| 1,201–1,500 | 300.00 | 125.00 | 200.00 | | | | |

The charge for shifting lumber schooners in the harbor is $15, while the charge for all other vessels is $25.

*Harbor dues.*—No harbor dues are assessed at this port.

*Dockage.*—Seattle is frequently called a free port, this designation being used to indicate that no charge is made against oceangoing vessels while loading or discharging cargo. Vessels that are out of commission or are awaiting cargo at any publicly owned terminal, however, must pay the following dockage charges per day of 24 hours or part thereof, based on gross tonnage: 1 to 50 tons, $1; 51 to 100 tons, $2; 101 to 150 tons, $3; 151 to 200 tons, $4. Idle vessels of more than 200 gross tons pay $4 per day and three-fourths of a cent for each ton over 200. Vessels undergoing repairs pay one-half of the above rates.

All inland passenger vessels pay dockage upon net tonnage at the above rates for idle oceangoing vessels, if in commission; and at one-half of the above rates, if idle. The city maintains eight steel mooring buoys in the harbor, and vessels are charged $5 for the first three days and $2 per day thereafter for the use of one of the buoys.

*Wharfage.*—The following is a list of charges for wharfage on the more important commodities handled at the terminals under the control of the Port of Seattle:[a]

[a] Tariff No. 2, Resolution No. 227, of the port of Seattle, issued Dec. 9, 1914, effective Mar. 4, 1915.

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| Commodities. | Rates. |
|---|---|
| Acid: | |
| In carboys.....each.. | $0.10 |
| In drums.....per ton.. | .20 |
| Ammonia in drums.....do.... | .20 |
| Ammunition, fixed.....do.... | .30 |
| Asphaltum, in barrels.....do.... | .15 |
| Bags or bagging.....do.... | .20 |
| Box shooks.....do.... | .30 |
| Butter, fresh.....do.... | .20 |
| Canned goods (except salmon).....do.... | .20 |
| Cement and plaster.....do.... | .15 |
| Coal: | |
| In sacks.....do.... | .20 |
| In bulk [a].....do.... | .10 |
| Copper, in bar, ingot, or matte.....do.... | .20 |
| Cordage and twine.....do.... | .30 |
| Feed, mill and stock.....do.... | .20 |
| Fertilizer.....do.... | .20 |
| Fish.....do.... | .20 |
| Flour.....do.... | .20 |
| General merchandise.....do.... | .20 |
| Glass, plate and mirror.....do.... | .30 |
| Grain, in sacks.....do.... | .20 |
| Gravel, sand, crushed rock.....do.... | .10 |
| Gypsum.....do.... | .10 |
| Hay or straw: | |
| Single compressed.....do.... | .20 |
| Double compressed.....do.... | .15 |
| Hides, green.....do.... | .20 |
| Iron and steel.....do.... | .20 |
| Iron, pig.....do.... | .10 |
| Lead, pig.....do.... | .20 |
| Lime.....per barrel.. | $0.025 |
| Liquor, in wood.....per ton.. | .30 |
| Live stock: | |
| Cattle, horses, mules.....each.. | .10 |
| Goats, hogs.....do.... | .05 |
| Lumber and timber products: | |
| Softwood ..... per 1,000 feet b. m.. | .20 |
| Hardwood .....per 100 feet b. m.. | .20 |
| Hardwood logs.....per ton.. | .20 |
| Lath.....per 1,000.. | .05 |
| Shingles.....do.... | .02 |
| Meat, fresh, etc.....per ton.. | .40 |
| Nails, spikes, and bolts.....do.... | ..... |
| Ore and concentrates: | |
| In bulk.....do.... | .10 |
| In sacks.....do.... | .15 |
| Pipe, cast or wrought iron.....do.... | .20 |
| Rice.....do.... | .20 |
| Salmon: | |
| Canned [a].....do.... | .20 |
| Pickled or salted.....do.... | .20 |
| Sugar.....do.... | .20 |
| Sirup, or molasses, in wood.....do.... | .20 |
| Tin: | |
| Pig.....do.... | .20 |
| Plate.....do.... | .20 |
| Vegetables, in sacks or crates.....do.... | .20 |
| Wire: | |
| Plain or barbed.....do.... | .20 |
| Insulates.....do.... | .30 |
| Wire cables or wire rope.....do.... | .20 |

[a] Includes free storage for first 30 days on inward shipments.

The charge for articles of general merchandise not specified in the above list is 20 cents per short ton.

The rates of wharfage at the railroad wharves at Seattle are practically the same as the rates at Tacoma (see pp. 326 and 327).

*Stevedoring charges.*—The following is a list of the prevailing rates per ton for stevedoring for a number of commodities, the term "stevedoring" covering the handling of cargo from ship's side to ship's stowage in loading and from ship's stowage to ship's side in sling discharging. Trucking to and from ship's side and sorting and piling cargo within the wharf shed are not included in the rates for stevedoring, but must be paid for at rates ranging from 30 cents to 45 cents per hour.

| Discharging: | Rates per ton. |
|---|---|
| Ballast | $0.35 |
| Brick, tile | .60 |
| Cement | .40 |
| Coke | .70 |
| Coal | .40 |
| Creosote oil, in drums | .40 |
| Glass | .60 |
| Glassware | .60 |
| Crockery | .60 |
| Pig iron | .40 |
| Railroad and structural iron, piping, and chain | 1.15 |
| Sugar, in bags | .25 |
| General cargoes, n. e. s | .40 |
| For discharging or loading heavy or bulky packages in single pieces weighing more than 2 tons, same rate plus 12½ per cent. | |

| Loading: | Rates per ton. |
|---|---|
| Wheat | $0.30 |
| Wheat, in 240-pound bags | .31½ |
| Flour | .30 |
| Barley | .32½ |
| Oats | .32½ |
| Canned salmon | .45 |
| Fish, in boxes | .50 |
| Coal, in sacks | .45 |
| Coal, bunker-trimmed | .20 |
| Railroad iron, in 2,000-ton lots or more | .70 |
| Railroad iron in smaller lots | .75 |
| Cotton, per bale | .15 |
| General cargo, n. e. s | .42½ |
| Lumber from $1.15 to $1.50 per 1,000 feet, according to dimensions and whether carried in steam or sailing vessel. | |
| Shifting cargo or ship's work, actual cost plus 12½ per cent. | |

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The quantity of cargo that can be loaded or discharged per day depends altogether on the commodity and the facilities. As a usual thing, cargoes such as coal, pig iron, and general merchandise can be handled at the rate of 200 tons per day per gang, while cargoes such as flour or wheat can be handled at the rate of 600 tons per day per gang with the use of electric conveyors.[a]

## STOCKTON, CAL.

The city of Stockton is situated at the head of Stockton Channel, which is 2½ miles long and connects the city with San Joaquin River. The upper end of this channel forms the most important part of Stockton Harbor. The harbor consists also of the lower 1¾ miles of Mormon Channel, which enters Stockton Channel about 1 mile below the city, and of Fremont Channel and McLeod Lake, which are small arms of Stockton Channel near its head.

The city is about 45 miles above the mouth of San Joaquin River in Suisun Bay, which is about 50 miles from the Golden Gate entrance to San Francisco Bay. The maximum draft that could be carried June 30, 1914, at mean low water over the shoalest parts of the channel between the mouth of the river and the city of Stockton was about 6 feet and in the Mormon Channel about 5 feet. The range of tide is about 3 feet.

Much of the San Joaquin River valley below Stockton is—

A rich delta region consisting of numerous large tracts of fertile land under a high state of cultivation, more or less surrounded and protected from overflow by extensive levee systems constructed and maintained by the landowners. Throughout the delta region there are numerous navigable branches, sloughs, and canals tributary to the main river. In excavating material for the levees the builders left many miles of canals capable of being navigated by the largest steamboats in the San Joaquin River. These canals, or dredger cuts, are subject to tidal influence and afford the only means of transportation for the products of the reclaimed lands. While the length of the main river through the delta is about 65 miles, the aggregate length of the network of natural and artificial waterways tributary to it in that region is over 200 miles.[b]

**Railroads.**—Stockton is served by the Atchison, Topeka & Santa Fe, the Southern Pacific, the Stockton Terminal & Eastern, the Tidewater Southern, and the Western Pacific Railroads, in addition to the Central California Traction Co., which operates an electric railway between Stockton and Sacramento and carries freight as well as passengers.

The Tidewater Southern Railway extends at present to Modesto, 33 miles distant. When completed, it will extend to Fresno, 80 miles distant. The Stockton Terminal & Eastern Railroad extends to Bellota, about 19 miles distant.

**Steamship lines.**—The principal regular lines of steamboats on the San Joaquin River are the California Navigation & Improvement Co. and the California Transportation Co., both of which operate between San Francisco, Stockton, and intermediate points on the San Joaquin River. The former operates one boat daily in each direction and the latter four boats weekly in each direction.

The number of craft of various kinds that operate on the San Joaquin River is indicated in the following tabular statement:[c]

[a] From booklet issued by Seattle Chamber of Commerce, Apr. 1, 1915.
[b] Report, Chief of Engineers, U. S. Army, 1914, p. 1344.
[c] Idem, p. 3175.

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| Kind of craft. | Operating exclusively in San Joaquin River and Stockton and Mormon Channels. | Operating partly in San Joaquin River and Stockton and Mormon Channels, partly in other rivers. | Total. |
|---|---|---|---|
| Stern-wheel and screw-propeller steamboats | 8 | 13 | 21 |
| Screw-propeller gasoline boats | 53 | 42 | 95 |
| Gasoline launches | 37 | 78 | 115 |
| Rigged scows, barges, and schooners | 6 | 41 | 47 |
| Unrigged scows and barges | 13 | 34 | 47 |
| Total | 117 | 208 | 325 |

Practically all the traffic is in the delta region, below San Joaquin Bridge, approximately 65 miles above the mouth of San Joaquin River. While the San Joaquin Bridge is the actual head of all-the-year-round navigation, the city of Stockton, at the head of Stockton Channel and 45½ miles above the mouth of the San Joaquin River, is the principal head of navigation by reason of the fact that that city is the principal commercial center and collecting and distributing point of the region. A very considerable portion of the freight is carried or towed by numerous tugboats, launches, barges, and small schooners. A complete compilation of the traffic handled by these craft has been found to be impracticable.[a]

**Commerce of the port.**—Details as to the commerce of the San Joaquin River in the calendar years 1913 and 1914 are shown in the following tabular statement:[a]

| Commodities. | Short tons. | | Value. | |
|---|---|---|---|---|
| | 1913 | 1914 | 1913 | 1914 |
| Miscellaneous merchandise | 253,751 | 152,358 | $25,375,100 | $19,036,575 |
| Vegetables, fresh | 111,830 | 230,667 | 4,473,200 | 6,601,660 |
| Grain | 105,271 | 134,665 | 3,158,130 | 3,413,082 |
| Mill stuffs (flour, etc.) | 53,325 | 55,688 | 1,599,750 | 2,798,720 |
| Live stock | 7,042 | 6,851 | 1,408,400 | 999,110 |
| Oil (fuel and other grades) | 88,783 | 90,463 | 763,534 | 1,108,073 |
| Canned and dried fruit, vegetables, and meats | 3,196 | 1,724 | 511,360 | 206,940 |
| Lumber | 37,920 | 25,976 | 492,960 | 259,760 |
| Hay | 14,548 | 12,542 | 203,672 | 100,336 |
| Fruit, fresh | 1,256 | 226 | 175,840 | 15,820 |
| Sand and gravel | 124,328 | 31,855 | 90,759 | 21,236 |
| Coal | 4,598 | 1,702 | 45,980 | 13,616 |
| Brick | 14,551 | 10,699 | 42,489 | 32,097 |
| All other | ..... | 16,740 | ..... | 872,716 |
| Total | 820,399 | 772,156 | 38,341,174 | 35,479,741 |

**Extent and ownership of water front.**—Nearly 6 miles of water front are available in Stockton Harbor but less than 4 miles have been developed. Approximately 24,400 feet are publicly owned, while 6,748 feet are owned by private corporations.

**Terminals.**—All of the wharves on the Stockton and Mormon Channels at Stockton are parallel to the stream and consist of concrete or timber-pile bulkheads along the shore with timber decks or floors.

The city of Stockton owns approximately 5,777 feet of improved frontage, 5,377 feet having a concrete bulkhead and 400 feet a timber-pile bulkhead. Private interests have improved about 3,000 feet of frontage, all of which has timber-pile bulkheads.

[a] Report, Chief of Engineers, U. S. Army, 1914, pp. 3175-76; idem, 1915, p. 3352.

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The following table gives the general location, dimensions, and occupants of the principal wharves owned by the city of Stockton:

| Wharves. | Length. | Width. | Occupants. |
|---|---|---|---|
| STOCKTON CHANNEL. | | | |
| | *Feet.* | *Feet.* | |
| Wharf A | 480 | 62 | California Transportation Co. |
| Wharf B | 76 | 32 | Colberg Motor Boat Co. |
| Wharf C | 40 | 26 | Empire Navigation Co. |
| Wharf D | 448 | 33 | Island Transportation Co. |
| Wharf E | 12 | 25 | M. McCormick Co. |
| Wharf F | 391 | 35 | California Navigation & Improvement Co. |
| Wharf G | 200 | 38 | Central California Traction Co. |
| Wharf H | 328 | 22 | Sperry Flour Co. |
| Wharf I | 100 | 40 | Do. |
| Wharf J | 1,600 | 30 | Public use. |
| Wharf K | 120 | 55 | Standard Oil Co. |
| Wharf L | 96 | 56 | Associated Oil Co. |
| Wharf M | 110 | 54 | Union Oil Co. |
| MORMON CHANNEL. | | | |
| Wharf A | 172 | 54 | Stockton Lumber Co. |
| Wharf B | 100 | 30 | San Joaquin Lumber Co. |
| Wharf C | 136 | 30 | Stockton Warehouse Co. |

Only one municipal wharf is open to public use, the others being leased to and used exclusively by various corporations. Only a few municipal wharves, viz, F, G, I, and J, on Stockton Channel and Wharf A on Mormon Channel, have railroad connections.

The following is a list of the principal privately-owned wharves on Stockton and Mormon Channels, with the principal dimensions and owner of each, as described in the Special Report of the Chief of Engineers on Water Terminals and Transfer Facilities:[a]

| Wharves. | Length. | Width. | Owners. |
|---|---|---|---|
| STOCKTON CHANNEL. | | | |
| | *Feet.* | *Feet.* | |
| Wharf No. 1 | (a) | (a) | Julia H. Weber. |
| Wharf No. 2 | 300 | 150 | California Wharf & Warehouse Co. |
| Wharf No. 3 | 200 | 75 | Stockton Milling Co. |
| Wharf No. 4 | 300 | 155–175 | California Navigation & Improvement Co. |
| Wharf No. 5 | 548 | 168 | Farmers Union & Milling Co. |
| Wharf No. 6 | 300 | 100 | Western Pacific Ry. Co. |
| Wharf No. 7 | 506 | 80–150 | Atchison, Topeka & Santa Fe Ry. |
| MORMON CHANNEL. | | | |
| Wharf No. 1 | 330 | 250 | Stockton Warehouse Co. |
| Wharf No. 2 | 314 | 100–200 | L. F. Stein. |

[a] Not reported.

All of the above-listed wharves are provided with sheds, and all except wharves Nos. 1 and 3 on Stockton Channel have railroad connection.

**Port administration.**—The harbor is under the control of the municipality, the administrative authority being vested in a city commission. One of the commissioners, the commissioner of public works, is specially assigned to harbor affairs, but regulations concerning charges and conditions of use as well as contracts for improvements must be approved by the entire commission. A harbor master

[a] House Document No. 226, Sixty-third Congress, first session, pp. 1417–1430.

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enforces the harbor regulations, collects rents and dockage, and has general oversight of harbor matters.

Improvements are made from a special fund known as the Permanent Water-front Improvement Fund, which consists of 4 per cent of all fees received from justice court, hospital, plumbing inspection, electrical inspection, pound, and engineering services, from sales and forfeitures of franchises, and from licenses, the last named being the principal source. In 1913 the fund received $3,159.46 from these sources. Operating expenses and repairs are paid out of receipts from wharf rentals and dockage, $15,869.43 being collected from these sources in 1913.

**Port charges.**—All but one of the municipal wharves are leased to private corporations at a monthly rental of 25 cents per lineal foot. The one wharf which is open at all times to public use is used intermittently, the dockage charge for boats of less than 150 tons being 3 cents per ton and for boats of more than 150 tons 1½ cents per ton for the first 150 tons and three-fourths cent for each additional ton.

## TACOMA, WASH.

Tacoma is situated on the southern and southwestern shores of Commencement Bay, an arm of Puget Sound, about 30 miles south of Seattle. The harbor may be said to include all of Commencement Bay, which is 2½ miles long and has an average width of nearly 2 miles. The United States Coast and Geodetic Survey reports that "the waters of the bay are deep throughout, ranging from 50 fathoms at the entrance to 25 and 30 fathoms at the head, where the rise to the flats is very abrupt. The bay is easy of access and free from dangers."[a] The mean range of tide is 13 feet. An outline map of the harbor is shown opposite this page.

The principal water front is on the southwestern shore of the bay. At the southern end, where the Puyallup River enters, there are extensive tidal flats in which a number of waterways or channels have been constructed. These flats have been formed by deposits of silt from the Puyallup River. Two channels, the City Waterway and the Puyallup Waterway, have been excavated through these flats, and a considerable length of water front has thereby been added.

An attempt was made by the Federal Government to extend the navigable channel of the Puyallup River. This improvement was, however, rendered impracticable by the excessive deposit of silt carried down the river. It appears that in the improvement of the White River by King County, of which Seattle is the county seat, a dam had been constructed which diverted that river from its former outlet, the Duwamish River, to the Puyallup and added greatly to the amount of silt carried by the latter. Then followed litigation between King County and Pierce County, of which Tacoma is the county seat, which was settled about a year ago by an agreement between the two counties. Under this agreement the counties have entered upon a joint project for straightening the Puyallup River and improving its banks so as to reduce erosion and the accumulation

[a] Coast Pilot, Pacific Coast, 1909, p. 157.



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of silt. King County is to pay three-fifths of the cost of the improvement and Pierce County two-fifths.

**Railroads.**—Tacoma is served by the Chicago, Milwaukee & St. Paul, the Great Northern, the Northern Pacific, and the Oregon-Washington Railroad and Navigation Co. railroads. There is no belt-line or marginal railway along the water front, the only connection between the several lines consisting of switches.

**Steamship lines.**—The following is a list of coastwise lines whose vessels call regularly at the port of Tacoma:

Alaska Steamship Co., which operates one boat every three days between Tacoma and various ports in Alaska.

American-Hawaiian Steamship Co., which operates between Tacoma and other Puget Sound ports, San Francisco, and Los Angeles, and New York, Boston, and Philadelphia, via the Panama Canal, one freight steamer per week in each direction. This line also operates to the Hawaiian Islands, one steamer leaving every 10 days.

Atlantic & Pacific Steamship Co., which operates (via the Panama Canal) one freight boat every three weeks in each direction between Tacoma and other Puget Sound ports, San Francisco, Los Angeles, and New York.

Border Line Transportation Co., which operates two freight boats weekly in each direction between Puget Sound ports and British Columbia.

Canadian Pacific Railway Steamship Lines, which operate one boat daily in each direction between Vancouver and various Puget Sound ports, including Tacoma.

Matson Navigation Co., which operates one freight boat in each direction every three weeks between Tacoma, Seattle, and Hawaiian ports.

Merchants' Transportation Co., which operates a daily freight service between Tacoma and Seattle.

New York & Pacific Steamship Co., which operates one freight boat monthly in each direction between Puget Sound ports, San Francisco, and various ports on the west coast of South America.

Olympia & Tacoma Navigation Co., operating two steamers daily between Tacoma and Olympia and Shelton.

Pacific Alaska Navigation Co., which operates two freight and passenger boats weekly in each direction between San Francisco, Seattle, and Tacoma and two freight and passenger boats every 10 days in each direction between Seattle and Tacoma and ports in Alaska.

Pacific Coast Steamship Co., which operates three boats weekly in each direction between Tacoma and California ports.

Puget Sound Navigation Co., which operates two boats between Tacoma and Seattle. These boats make eight round trips daily.

The following is a list of the principal lines of steamers plying between the Pacific coast and the Orient and Europe that call regularly [a] at Tacoma:

| Lines. | Sailings. | Ports of call. |
|---|---|---|
| China Mutual Steam Navigation Co.[a] | 1 monthly..... | Liverpool, London, etc., via the Orient and the Suez Canal. |
| Hamburg-American Line..... | .....do..... | Hamburg via the Orient and the Suez Canal. |
| Harrison Direct Line..... | .....do..... | Liverpool and London. |
| Johnson Line[b]..... | .....do..... | Scandinavian ports. |
| Nippon Yusen Kaisha..... | 2 monthly..... | China, Japan, and the Philippines. |
| Osaka Shosen Kaisha Co..... | .....do..... | Do. |
| Royal Mail Steam Packet..... | 1 monthly..... | Liverpool, London, etc., via the Orient and the Suez Canal. |

[a] Service suspended on account of war in Europe. [b] Service temporarily suspended.

**Commerce of the port.**—The value of the commerce of this port in the calendar year 1913 was $73,465,331,[b] classified as follows:

[a] Except as interrupted by the European war.

[b] Report, Chief of Engineers, U. S. Army, 1914, p. 3256. These data have been revised, on the basis of later statistics compiled by the harbor master at Tacoma.

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| Class. | Foreign. | Coastwise. | Total. |
|---|---|---|---|
| Receipts | $24,169,016 | $14,665,618 | $38,834,634 |
| Shipments | 22,417,537 | 12,213,160 | 34,630,697 |
| Total | 46,586,553 | 26,878,778 | 73,465,331 |

Complete statistics as to tonnage are not at hand. Partial statistics indicate that a minimum of 1,494,100 short tons of freight were handled at this port in the calendar year 1913, shipments amounting to 843,059 short tons and receipts to 651,041 tons.

The following table contains a list of the principal shipments to foreign countries in 1913:

| Commodities. | Value. | Commodities. | Value. |
|---|---|---|---|
| Flour | $5,217,454 | Smelter products | $1,064,015 |
| Cotton, raw | 4,085,969 | Agricultural implements | 479,538 |
| Wheat | 2,268,298 | All other | 5,897,543 |
| Machinery | 2,240,731 | | |
| Lumber | 1,163,989 | Total | 22,417,537 |

Details as to the commodities imported from foreign countries are not available.

The following table contains a list of the principal shipments in 1913 in the coastwise trade:

| Commodities. | Value. | Commodities. | Value. |
|---|---|---|---|
| Smelter products | $2,866,187 | Coal | $367,433 |
| Wheat | 1,160,550 | All other | 4,771,502 |
| Flour | 1,128,782 | | |
| Lumber and timber products | 1,100,976 | Total | 12,213,160 |
| Feed | 817,730 | | |

The principal receipts in the coastwise trade in 1913 were ores, $7,332,028, and oils, $1,462,271.

**Extent and ownership of water front.**—It has been estimated that 22.1 miles of water front are available at the port of Tacoma, not including 4.2 miles which are outside of the limits of the city. The city owns nearly 4 miles in addition to the street ends on the water front, but 3.6 miles abut on Point Defiance Park. The remainder of the frontage is owned by the various railroad companies, manufacturing establishments, and private individuals. Not more than one-third of the privately-owned frontage has as yet been developed for commercial purposes.

The improved frontage lies on the west side of the bay and along the City Waterway, Middle Waterway, and Puyallup Waterway and the slip excavated by the Chicago, Milwaukee & St. Paul Railway Co.

**Terminals.**—The city of Tacoma owns and operates two modern terminals, known as the Municipal Dock and City Dock. Municipal Dock has a frontage of 500 feet along the water front and a width of 170 feet. It is provided with a warehouse of frame construction and has one railroad track along the shore side. This wharf is used chiefly for passenger and express freight traffic.

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City Dock has a water frontage of 300 feet and is 175 feet wide. It is used principally by the "mosquito fleet." The buildings on this wharf are leased to commission men.

The city owns another terminal which is known as the McCarver Street Wharf. This wharf extends along the water front for a distance of 100 feet, and is 300 feet wide. This wharf is used principally by fishing boats and other small craft.

In addition to the frontage occupied by these wharves, the city owns 800 feet fronting on City Waterway and 300 feet on Middle Waterway, that are leased to industrial companies.

The water-front holdings of the Northern Pacific Railway Co. include 2,100 feet of wharf extending north from the foot of South Second Street, and the following wharf sheds:[a]

| Wharf sheds. | Length. | Width. | Floor space. | Operators or lessees. |
|---|---|---|---|---|
| | *Feet.* | *Feet.* | *Sq. ft.* | |
| Puget Sound | 400 | 50 | 20,000 | Northern Pacific Ry. Co. |
| Ocean No. 1 | 600 | 105 | 63,000 | Commercial Dock Co. and Northern Pacific Ry. Co. |
| Ocean No. 2 | 800 | 120 | 96,000 | Northern Pacific Ry. Co. |
| Commercial No. 1 | 600 | 125 | 75,000 | Commercial Dock Co. |
| Eureka | 400 | 125 | 49,500 | Eureka Dock Co. |
| Balfour | 1,100 | 125 | 137,500 | Balfour, Guthrie & Co. |
| London | 400 | 125 | 49,500 | Kerr, Gifford & Co. |
| Northwestern | 360 | 125 | 45,000 | Northern Grain & Warehouse Co. |

In addition to these warehouses the Northern Pacific Railway has a coal bunker 416 feet long and 36 feet wide located about 550 feet north of Ocean Warehouse No. 2. "This bunker stands about 265 feet back from the face of the dock on which the delivery tower is built. Coal is conveyed to this tower through an underground tunnel by conveyor buckets, which are elevated to delivery chutes to suit the height of steamer receiving the coal. The delivery capacity of the bunker is 600 tons per hour."[b] The bunker is operated by electricity and has a storage capacity of 16,100 tons of coal.

The Commercial Dock Co. leases a part of Ocean Warehouse No. 1, this portion being known as Commercial Dock No. 2. This dock is used by the W. R. Grace & Co. steamship lines and prior to August 1, 1914, was used also by the vessels of the Kosmos Line. The balance of the dock and warehouse, 350 feet, is occupied by the Northern Pacific Railway Co., the northerly 100 feet being used for a bonded warehouse and the remainder for freight handled between the railroad and the boats of the Pacific Coast Steamship Co., and the Pacific Alaska Navigation Co., and miscellaneous boats.

Ocean Warehouse No. 2 is used by the Ocean Steamship Co. (Blue Funnel Line); Commercial Dock No. 2 by the Pacific Alaska Navigation Co., the Border Line Transportation Co., and the Canadian Pacific Railway line of steamers plying between Vancouver and Tacoma; and Eureka Dock by the American-Hawaiian Steamship Co., the Matson Navigation Co., the Charles Nelson Line, and the Pacific Coast Steamship Co. Balfour Dock is used by the Harrison Line of steam-

[a] Terminal facilities of North Pacific Ports, 1914, pp. 202-205.
[b] Idem, pp. 203-204.

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ers and is equipped with a grain-cleaning plant. London and Northwestern Docks are used exclusively by Kerr, Gifford & Co., and the Northern Grain & Warehouse Co., respectively, for handling their grain business.

The principal terminal of the Chicago, Milwaukee & St. Paul Railway Co., which is known as the Oriental Dock, is located on the west side of the waterway, which was excavated by the company and is 2,000 feet long, 215 feet wide, and 35 feet deep at mean low water. The dock proper extends 940 feet along the channel and is 175 feet wide and covered by a one-story wharf shed. Two tracks on the water side and four tracks on the land side run the full length of the dock, and, in addition, a depressed track extends through the center of the dock for a distance of 440 feet.

Beyond Oriental Dock are a platform or open wharf 360 feet long, a lumber dock, and a car-ferry transfer slip.

The Chicago, Milwaukee & St. Paul Railway Co. also owns a grain elevator that is operated by the Leitch Warehouse & Grain Co. This elevator occupies a water frontage of about 1,100 feet and has a storage capacity of 106,000 bushels of bulk grain and 994,000 bushels of sacked grain. It has equipment for loading grain at the rate of 7,000 bushels per hour.

In addition to the railway terminals used for handling grain, there are several that are owned by private companies. The Puget Sound Flouring Mills Co. has a warehouse 800 feet in length on the water front and an elevator of 21,000 bushels capacity and a mill in the rear. The Sperry Flour Co. and the Tacoma Grain Co. are also located on the water front, the warehouse of the former having a storage capacity of 40,000 tons and those of the latter 21,000 tons.

A number of wharves are owned and occupied by lumber and industrial companies.

**Type of wharf construction.**—The prevailing type of wharf construction is that of pile-and-timber bulkheads and quays lying parallel to slips or to the main channel.

**Port administration.**—The port is under the control of the municipality. The construction, maintenance, and operation of the municipal docks are controlled by the department of public works, while the enforcement of harbor regulations is in the hands of a harbor master, who is an official of the department of public affairs. In immediate charge of the municipal docks is the superintendent of docks, who is appointed by the commissioner of public works and is assisted by 10 employees.

Funds for harbor improvement and wharf construction are provided by issues of bonds or by appropriations made by the city council from the general funds of the city. The net income from the municipal terminals is placed in a sinking fund to retire harbor-improvement bonds. The city has power to purchase, but apparently not to acquire by condemnation, property for water terminals and to operate terminal facilities, such as warehouses, railroads, etc.

**Port charges.**—*Pilotage.*—Pilotage is not compulsory on Puget Sound, although pilots may be secured at Port Angeles or Port Townsend, the charge for pilotage inward and outward combined ranging from $125 to $175.

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*Towage.*—The following are the prevailing rates for towing single-deck and double-deck vessels in each direction between Cape Flattery (the sea), Port Townsend, and Port Angeles, and Tacoma.

| Net register tonnage. | Charges between Tacoma and— | | | Net register tonnage. | Charges between Tacoma and— | | |
|---|---|---|---|---|---|---|---|
| | Cape Flattery. | Port Townsend. | Port Angeles. | | Cape Flattery. | Port Townsend. | Port Angeles. |
| Single-deck vessels: | | | | Double-deck vessels: | | | |
| 150 to 250 | $105.00 | $40.00 | $65.00 | 851 to 1,000 | $275.00 | $110.00 | $175.00 |
| 251 to 350 | 125.00 | 50.00 | 80.00 | 1,001 to 1,200 | 300.00 | 125.00 | 200.00 |
| 351 to 450 | 145.00 | 60.00 | 95.00 | 1,201 to 1,500 | 325.00 | 150.00 | 225.00 |
| 451 to 500 | 155.00 | 65.00 | 103.00 | 1,501 to 1,800 | 350.00 | 175.00 | 250.00 |
| 501 to 550 | 165.00 | 70.00 | 110.00 | 1,801 to 2,000 | 375.00 | 200.00 | 275.00 |
| 551 to 600 | 175.00 | 75.00 | 118.00 | 2,001 to 2,500 | 400.00 | 225.00 | 300.00 |
| 601 to 650 | 185.00 | 80.00 | 125.00 | 2,501 to 2,750 | 425.00 | 250.00 | 325.00 |
| 651 to 700 | 195.00 | 85.00 | 133.00 | 2,751 to 3,000 | 450.00 | 275.00 | 350.00 |
| 701 to 750 | 205.00 | 90.00 | 140.00 | 3,001 to 3,500 | 475.00 | 300.00 | 375.00 |
| 751 to 850 | 245.00 | 100.00 | 155.00 | | | | |
| 851 to 1,000 | 275.00 | 110.00 | 175.00 | | | | |
| 1,001 to 1,200 | 300.00 | 125.00 | 200.00 | | | | |
| 1,201 to 1,500 | 325.00 | 150.00 | 225.00 | | | | |

*Harbor dues.*—Vessels are not required to pay harbor dues at this port.

*Dockage.*—No dockage charge is made against ships loading or discharging cargo. Idle ships, or those loading or discharging ballast, must pay dockage at rates fixed by private agreement. The city of Tacoma maintains two mooring buoys, the charges for the use of a buoy being $5 for the first five days or less and $2 for each day after the fifth.

*Wharfage.*—For all freight passing over the municipal wharves, except stores for ships using the wharf, a wharfage charge must be paid. The prevailing rate appears to be 25 cents per ton of 2,000 pounds or 40 cubic feet, and this is the rate on flour, hay, grain, feed, fruits, vegetables, crated or sacked, dressed meats, poultry crates, tiles, box shooks, and articles not specified in a list of 49 commodities. The following are the charges on lumber and timber products: Lumber per 1,000 feet, 25 cents; laths per 1,000, 10 cents; green shingles per 1,000, 15 cents; and kiln-dried shingles per 1,000, 10 cents.

The principal wharfage charges at the dock operated by the Chicago, Milwaukee & St. Paul and the Northern Pacific Railroads are as follows:[a]

| Commodities. | Charges. | Commodities. | Charges. |
|---|---|---|---|
| All freight not otherwise specified, per ton [a] | $0.50 | Lumber.....per 1,000 feet b. m.. | $0.50 |
| Explosives and gasoline.....per ton [b].. | 1.00 | Lath.....per 1,000 pieces.. | .10 |
| Canned salmon or pickled fish....do.... | .25 | Shingles.....do.... | .05 |
| Coal.....do. [c].. | .25 | Piling: | |
| Asphaltum.....do. [b].. | .25 | 24 feet and under.....each.. | .03 |
| Box shooks.....do.... | .25 | 24 to 50 feet.....do.... | .06 |
| Cement.....do.... | .25 | Over 50 feet.....do.... | .10 |
| Grain.....do.... | .25 | Horses, mules, cattle.....per head.. | .50 |
| Plaster.....do.... | .25 | Stallions.....do.... | 1.00 |
| Salt.....do.... | .25 | Colts, calves, dogs.....do.... | .25 |
| Staves and headings.....do.... | .25 | Sheep, hogs, goats.....do.... | .10 |

[a] Local freight tariff of wharfage, storage, loading, and unloading charges at Tacoma, Wash., C. M. & St. P. Ry., P. C. L., No. 243, C. (I. C. C. No. 150) and N. P. Ry. No. 140, I (I. C. C.) No. 5506.
[b] Ton of 2,000 pounds weight or 40 cubic feet measurement, whichever yields the greater revenue.
[c] Ton of 2,240 pounds.

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The rate of 50 cents per ton on all freight not otherwise specified includes loading or unloading charges on carload traffic when shipped to or from Tacoma. Freight transferred directly from one vessel to another without passing over the wharf or requiring the use of wharf facilities is assessed one-half of the regular wharfage rates.

The railroads absorb the wharfage, storage, loading, or unloading charges on through traffic for transportation by water and on trans-Pacific traffic interchanged between the Northern Pacific Railway or the Chicago, Milwaukee & St. Paul Railway and a number of specified steamship lines.[a] An exception is made in the case of shipments of canned salmon or pickled fish, which are subject to the rate stated in the foregoing tabular statement.

[a] China Mutual Steam Navigation Co. (Ltd.), Dodwell & Co., East Asiatic Steamship Co., Great Northern Steamship Co., Hamburg-American Line, Nippon Yusen Kaisha, Ocean Steamship Co. (Ltd.), Royal Mail Steam Packet Co., and Frank Waterhouse & Co.

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# CHAPTER V.

# GREAT LAKES PORTS.

## ASHLAND, WIS.

Ashland is located at the head of Chequamegon Bay, on the south shore of Lake Superior, 95 miles east of Duluth. The city owes its prominence as a port chiefly to its proximity to the ore deposits in the Menominee iron range of northern Wisconsin.

In regard to the harbor, the Lake Survey Bulletin states that "the natural depth at the entrance and through the bay up to the vicinity of the city is ample, and there is a depth of at least 19 feet at low-water datum up to the ore docks and along a considerable portion of the harbor."[a]

**Railroads.**—Ashland is served by the Chicago & North Western, the Minneapolis, St. Paul & Sault Ste. Marie, and the Northern Pacific railways.

**Steamship lines.**—Only two regular lines of steamships call at Ashland—the Chicago, Duluth & Georgian Bay Transit Co. and the Port Huron and Duluth Steamship Co.

**Commerce of the port.**—The water-borne commerce at this port in the calendar year 1914 amounted to 4,432,452 short tons, valued at $11,126,078. In the more nearly normal trade year 1913, which is preferable for purposes of discussion, it amounted to 5,623,309 short tons, valued at $15,880,858. The receipts were only 732,236 tons, and consisted chiefly of coal (45,786 tons of anthracite and 634,664 tons of bituminous). The only other commodity of importance shipped into Ashland was pulpwood, 33,540 short tons being received during the year. Shipments aggregated 4,891,073 tons, and included 4,858,818 tons of iron ore, 16,788 tons of pig iron, and 13,200 tons of lumber.[b]

**Extent and ownership of water front.**—There are 5 miles of harbor frontage protected by the Government breakwater. Four miles of this frontage has deep water along the harbor line. About one-fifth of the entire water front is owned by railroad companies. The remainder is owned by the city and various companies and private individuals, much of the frontage consisting of tracts which were formerly active sawmill sites, but which are no longer used for that purpose and are now available for wharves and slips. Much space is available that has never been improved.

**Terminals.**—The city of Ashland has as yet constructed no wharves. In 1912 the city acquired a site for a wharf with 600 feet frontage, and a dock and harbor board was created in April, 1915, to take charge of this work, but lack of funds has delayed the project indefinitely.

The principal terminals are the ore docks maintained by the Chicago & North Western Railway and the Minneapolis, St. Paul & Sault

[a] Lake Survey Bulletin No. 24 (April, 1915), p. 61.
[b] Report, Chief of Engineers, U. S. Army, 1914, p. 2854; idem, 1915, p. 3099.



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Ste. Marie Railway, which is popularly known as the "Soo Line" and is a part of the Canadian Pacific Railway system.

The Chicago & North Western Railway has two ore docks or trestles, each of which is 1,404 feet in length and about 70 feet high and has 234 pockets. One dock has a storage capacity of 58,500 tons and the other of 46,800 tons. The Soo Line has one ore dock which is 1,908 feet in length and 66 feet high and has 314 pockets, each of which holds 100 tons.

Next in importance to the ore docks are the coal wharves. Two coal docks are owned by the Chicago & North Western and the Soo Line Railroads and both are leased to the C. Reiss Coal Co. The Chicago & North Western dock is equipped with modern hoists that have an unloading capacity of 300 tons per hour. The Soo dock is also equipped with modern handling machinery and has a capacity for unloading 150 tons per hour. In addition to these coal docks are those owned by the Clarkson Coal & Dock Co. and the Pittsburgh & Ashland Coal & Dock Co. These also are equipped with modern unloading machinery, which has a capacity of from 150 to 180 tons per hour.

The coal dock leased by the C. Reiss Coal Co. from the Soo Line is known as Commercial Dock. The coal company grants in a very restricted way the use of this dock to vessels engaged in passenger and freight trade. The city of Ashland now (July, 1915) has pending before the State railroad commission an action to compel the railroad company to maintain this dock in condition to handle without discrimination all traffic offered.

Two piers are occupied by lumber companies—the Schweder Lumber Co. and the Bell Lumber Co. The pier of the Lake Superior Iron & Chemical Co. is used for shipping pig iron.

**Type of wharf construction.**—All the wharves are built in the form of long, narrow piers and are of pile and timber construction. The ore docks are high trestles, while the other piers are solid filled.

**Port administration.**—The harbor has been under the control of a dock and harbor board since April, 1915. This board consists of nine members appointed by the mayor and confirmed by the city council and has broad powers. The Wisconsin statute[a] under which this board was created gives municipalities the right and power to acquire water terminal property and to construct terminals.

**Port charges.**—The matter of port charges at a port of this type is of little general importance.

## ASHTABULA, OHIO.

Ashtabula is located on Lake Erie at the mouth of the Ashtabula River, about 54 miles east of Cleveland. Its prominence as a port is due chiefly to the volume of iron ore and coal handled over its docks. Its location on Lake Erie at one of the points closest to the Pittsburgh and Youngstown, Ohio, steel districts has contributed greatly to its development as an ore port.

Like many of the lake harbors, that of Ashtabula was, in its natural condition, entirely unsuited to the needs of modern commerce, but it has been improved by the construction of breakwaters and entrance piers or jetties and by considerable dredging.

[a] Wisconsin Statutes (1913 ed.), secs. 959–978 K.

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The harbor comprises the navigable portion of the Ashtabula River for a distance of about 9,300 feet above the entrance, three connecting slips, and two large slips opening directly into the lake under the protection of the breakwaters. All of the slips were built and are controlled by the Pennsylvania Railroad Co. and the Lake Shore & Michigan Southern division of the New York Central Railroad system. The depth of water in the inner harbor is 20 feet from the lake to a swing bridge 3,800 feet up the river, 19 feet deep for 3,500 feet beyond the bridge, and 18 feet for a distance of about 2,000 feet.[a]

**Railroads.**—Ashtabula is served by the Pennsylvania, the New York Central, and the New York, Chicago & St. Louis railroads, the first two having extensive water terminals in the city.

**Steamship lines.**—No regular lines of vessels operate from this port. The Pennsylvania & Ontario Transportation Co. operates a car ferry between Ashtabula and Port Burwell, Ontario, which connects the Pennsylvania Railroad with the Canadian Pacific Railway. This ferry makes, on the average, two trips daily in each direction and handles freight exclusively.

**Commerce of the port.**—In the calendar year 1914 the commerce of the port amounted to 11,833,302 short tons, valued at $29,529,689.[b] In the year 1913, which was a normal trade year and is preferable for purposes of discussion, 15,743,375 short tons of freight, valued at $45,952,628, were handled over the wharves of Ashtabula. Nearly three-fifths (59.3 per cent) of the total freight tonnage in 1913 consisted of iron ore, and more than two-fifths (40.4 per cent) of soft coal. Iron-ore receipts amounted to 9,336,461 short tons and soft-coal shipments, including 314,217 tons of bunker coal, to 6,367,924 short tons. The only other receipts in 1913, as reported by the Chief of Army Engineers,[c] were miscellaneous merchandise (2,198 tons), fish (1,000 tons), and lumber (700 tons), while the other shipments were manufactured steel (16,630 tons) and miscellaneous merchandise (18,462 tons).

**Extent and ownership of water front.**—The more important part of the inner harbor, the section north of the county swing bridge (at which point the channel makes a bend of 90° in less than 750 feet), is owned by the Pennsylvania and the New York Central Railroads. The former owns 5,150 feet of improved frontage and the latter 9,400 feet. Included in these totals are the frontages of the two piers at the entrance to the inner harbor, which were built and maintained by the Federal Government but later ceded to the railroads, one pier to each company. The companies have rebuilt the piers to form bulkheads for the made land, which they have extended out under the shelter of the breakwaters. The city of Ashtabula owns about 150 feet of frontage on the river.

**Terminals.**—The property of the New York Central Railroad is improved by eight wharves. Two are idle; three are operated as iron-ore docks—two by the Ashtabula & Buffalo Dock Co. and one by the Pollock-Becker Co.; two others are used as coal docks, and one other as a stone and sand dock. One of the idle docks was formerly used for package freight and the other for handling iron ore.

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[a] Lake Survey Bulletin No. 24 (April, 1915), p. 361.
[b] Report, Chief of Engineers, U. S. Army, 1915, p. 3285.
[c] Idem., 1914, p. 3088.

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Two of the ore docks have a frontage of 1,200 feet each and each is equipped with four Hulett electric unloading machines, using 15-ton automatic buckets and handling 2,000 to 2,200 tons apiece per hour. Each dock is further equipped with one storage bridge, one using a 15-ton clam and the other a 17-ton clam. The storage capacity of each dock is 1,000,000 tons. The other iron-ore dock owned by this railroad is not in active operation at present. It has 800 feet frontage and is equipped with four Hoover & Mason unloaders, using 5-ton buckets and having a handling capacity of 600 tons per hour.

Of the two coal docks owned by the New York Central Railroad one is operated by the Pittsburgh Coal Co. and the other by the Pickands-Mather Co. Each dock has a frontage of 1,200 feet and each is equipped with one mechanical car dumper (McMyler type). In a recent year 2,000,000 tons of soft coal were handled at the former and 500,000 tons at the latter dock.

The stone and sand dock on the property of the New York Central is equipped with two Brown hoists, traveling buckets, chutes for loading, and other handling appliances.

The Pennsylvania Railroad Co. has six wharves. Two are idle, one is used as an ore dock and two as coal docks, while the remaining dock is used by car ferries of the Pennsylvania & Ontario Transportation Co.

The ore dock is operated by the Ohio & Western Pennsylvania Dock Co. and occupies a frontage of 1,100 feet at the entrance to the river. The unloading equipment consists of six Hoover & Mason electric unloading machines, using 6-ton automatic buckets and having a capacity of 1,500 tons per hour. This dock has a storage capacity of 800,000 tons.

One of the coal docks is operated by the Pittsburgh Coal Co. This dock occupies a frontage of 1,200 feet and is equipped with a mechanical car dumper (McMyler type). The other coal dock occupies a frontage of 1,000 feet and is operated by the Lower Lakes Dock Co. This dock also is equipped with a mechanical car dumper of the McMyler type.

The car ferry dock has a frontage of 450 feet and is of pile and timber construction. The car ferries have a capacity of 32 cars and operate between Ashtabula and Port Burwell, Ontario, on the Canadian shore of Lake Erie.

A large dry dock and shipbuilding plant is located on the upper portion of Ashtabula River about 2 miles above the harbor entrance. This plant belongs to the Great Lakes Engineering Works. The dry dock has a length overall of 650 feet and a width of 85 feet at the bottom.

**Type of wharf construction.**—The prevailing type of construction is pile-and-timber or timber-crib wharves, 10,250 feet of frontage being so improved. Two thousand feet are of timber and steel-pile construction and 2,300 feet of concrete-crib construction.

**Port administration.**—The city council of Ashtabula has passed ordinances providing for free and unobstructed navigation in the harbor, the power of enforcing these regulations being vested in a harbor master. This marks the limit of the authority exercised by the city over port affairs.

**Port charges.**—The subject of port charges is of practically little significance at a port such as Ashtabula.

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## BUFFALO, N. Y.

The city of Buffalo is located at the extreme eastern end of Lake Erie at the mouth of the Niagara and Buffalo Rivers and is the western terminus of the new State Barge Canal as well as of the old Erie Canal. Because of its strategic location at the junction of important rail and water routes Buffalo has long been a port of high rank. None of the ports on the Great Lakes exceeds Buffalo in the value of its water-borne commerce, while only one, Duluth-Superior, has a greater volume of water traffic.

The port of Buffalo, like Chicago, Cleveland, Milwaukee, and other lake ports, has an outer and an inner harbor, as is indicated on map shown opposite this page. The outer harbor, which has been formed by extensive breakwaters erected by the Federal Government, is about 4½ miles long and 1,600 feet wide and has an area of about 680 acres. The chief use made of the outer harbor at present is for anchorage and mooring. At the close of navigation in the fall of 1914, 45 vessels loaded with 22,000,000 bushels of grain were moored at the breakwater awaiting an opportunity to proceed to an elevator.[a] The outer harbor is used extensively also as a channel by lake vessels entering at the north entrance and bound for the ore docks of the Lackawanna Steel Co., the Buffalo & Susquehanna Iron Co., and the Pennsylvania Railroad Co. at the southern end of the harbor, as well as by vessels entering at the south entrance and bound for the Buffalo River or inner harbor.

Closely connected with the outer harbor are the Lackawanna and the Union (Buffalo and Susquehanna) Canals. The approach from the south harbor entrance to the mouth of the Lackawanna Steel Co. canal is 1,900 feet long. The canal itself is 23 feet deep and 3,000 feet in length from the southern end of the outer harbor to the Lackawanna Steel Co. plant at Stony Point. The approach from the south entrance to the Union Canal is 2,000 feet long. This approach diverges from that to the Lackawanna Steel Co. canal about 800 feet from the entrance. The canal is 23 feet deep, 200 feet wide, and about 4,000 feet long, and extends into the properties of the Pennsylvania and the Buffalo & Susquehanna Railroad Cos., about 600 feet north of the southerly limits of the city.

The inner harbor may be divided into four sections, namely: Buffalo River, the City Ship Canal and Lehigh Valley Basin, Erie Basin, and Black Rock Harbor. The Buffalo River section of the inner harbor includes Buffalo River from the head of the entrance channel to the Abbott Road Bridge, 5 miles upstream. This section of the inner harbor is maintained by and under the jurisdiction of the city of Buffalo. The width of the channel between the practically continuous lines of docks from the mouth of the river to the Buffalo Union Furnaces, 2¼ miles above the mouth, is 175 to 300 feet and the depth is generally 22 to 23 feet at mean low level. For a distance of about one-half mile above the Buffalo Union Furnaces the channel is 200 feet wide and 23 feet deep. The city is now engaged in the work of widening and deepening this river to a point nearly 3 miles beyond the present deep channel.[b]

In connection with the Buffalo River there are several slips and basins which add greatly to the wharf frontage. The most important.

[a] American Elevator and Grain Trade, Apr. 15, 1915, p. 671.
[b] Lake Survey Bulletin No. 24 (Apr., 1915), pp. 336-346.

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are Ohio Basin, Peck or Main Street Slip, Evans Slip, and Commercial Slip.

Ohio Basin is an artificial waterway about 1,100 feet long and 500 feet wide, which is connected with the Buffalo River about 1¼ miles above its mouth by the Ohio Basin Slip. Ohio Basin and Ohio Basin Slip form a part of the Erie Canal system and are under the jurisdiction of the State of New York. At the present time the slip and basin are being widened and deepened, which will permit their use by vessels drawing more than 20 feet.

Commercial Slip is a channel connecting Buffalo River and the Erie Canal at its terminus. It is about 600 feet long, 60 feet wide, and 6½ feet deep, and is used only by canal boats and small tugs.

Peck Slip, or Main Street Slip, is a channel 400 feet long, 250 feet wide, and 20 feet deep connecting Buffalo River with the City Ship Canal opposite the foot of Main Street, about one-half mile above the mouth of the river. This slip is at present the only navigable connection between Buffalo River and the City Ship Canal and is used as a turning basin by the smaller lake vessels.

Evans Slip is a channel on the north side of the Buffalo River at its mouth, extending to elevators and lumber docks. It is about 700 feet long, 60 to 80 feet wide, and 19 feet deep.[a]

Parallel with the lake shore and located only a short distance from Buffalo River on one side and from the lake on the other is the City Ship Canal. This is entirely an artificial waterway which begins at the mouth of the Buffalo River and extends southeasterly in the general direction of the Buffalo River and 200 to 1,000 feet therefrom. The canal is nearly straight and is about 2½ miles long to the turn at the Lehigh Valley Basin. The northern 1½ miles is a public waterway constructed and maintained by and under the jurisdiction of the city of Buffalo. The remainder, about 1 mile, was constructed and is maintained by the Lehigh Valley and allied railroad interests, but is open to the public under the same rules and regulations as other waterways. The canal is about 200 feet in width and has a depth of from 20 to 23 feet. The Lehigh Valley Basins, which are connected with the Ship Canal by means of a channel 1,400 feet long and 200 feet wide, are, respectively, 2,000 feet and 1,600 feet in length, 200 feet in width, and 20 feet in depth.[a]

Erie Basin is practically a part of the outer harbor and was formed by a breakwater constructed by the State of New York. It was originally constructed as a receiving basin for the Erie Canal and is now being greatly improved for use as the principal terminal in Buffalo for the new State Barge Canal. It is planned to make Erie Basin the principal point of interchange of freight between lake vessels and canal boats. Three slips, 60 feet in width and 8 to 10 feet in depth, connect Erie Basin with the Erie Canal and are used only by canal boats and small tugs.

Black Rock Harbor and Canal is a waterway 3¼ miles long and 200 to 400 feet wide, lying along the Niagara River front of Buffalo, generally parallel with the Niagara River and separated therefrom by Bird Island Pier and Squaw Island, which serve as a dam or embankment to keep the water level of Black Rock Harbor and Erie Canal at the level of Lake Erie. The Black Rock Ship Canal, which is 200 to 400 feet wide, except at two bridges, and 23 feet deep, is used by vessels proceeding to Tonawanda and North Tonawanda, a number of miles above the city of Buffalo.

Because of the fact that the Buffalo River and City Ship Canal are close to the lake and mainly parallel thereto, their navigability is not

[a] Lake Survey Bulletin No. 24 (April, 1915), pp. 336-346.

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impeded by bridges to any great extent, as is the case at Cleveland, Chicago, South Chicago, and Milwaukee, where the streams and channels of the inner harbor flow through the heart of the city. There are only five bridges across the Buffalo River, three of which are about 4 miles above the mouth. Two bridges span Ohio Basin Slip and one crosses Evans Slip, both of which are comparatively inactive portions of the inner harbor. There are three bridges also across the City Ship Canal.

**Railroads.**—The city of Buffalo is one of the most important railroad centers in the United States, being served by the following railroads: Buffalo & Susquehanna Railway, Buffalo, Rochester & Pittsburgh Railway, Delaware, Lackawanna & Western Railroad, Erie Railroad, Grand Trunk Railway, Lake Shore & Michigan Southern Railroad, Lehigh Valley Railroad, Michigan Central Railroad, New York Central & Hudson River Railroad, New York, Chicago & St. Louis Railroad, Pennsylvania Railroad, Wabash Railroad, and West Shore Railroad.

**Steamship lines.**—The following lines of steamships, engaged chiefly in the passenger trade, operate regularly during the season of navigation between Buffalo and other ports on the Great Lakes:

The Chicago, Duluth & Georgian Bay Transit Co., which operates one boat weekly in each direction between Buffalo and Chicago during the months of July and August.

The Cleveland & Buffalo Transit Co., which operates one boat daily in each direction between Buffalo and Cleveland from about April 25 to November 29.

The Detroit & Cleveland Navigation Co., which operates one boat daily in each direction between Detroit and Buffalo from about May 1 to December 1.

The Northern Steamship Co., which makes two sailings in each direction weekly during the months of June, July, August, and September between Buffalo and Chicago, calling also at Cleveland, Detroit, and Milwaukee.

The following is a list of the lines of steamships engaged exclusively or largely in the freight traffic and forming parts of through rail and lake routes that call regularly[a] during the season of navigation at the port of Buffalo:

Erie & Western Transportation Co. (owned by Pennsylvania Railroad Co.), which operates three vessels between Buffalo and Duluth, with calls at Erie, Cleveland, Detroit, Marquette, and a few other lake ports. This line carries both freight and passengers, and its schedule for 1915 shows 31 sailings in each direction.

Erie Railroad Lake Line (an integral part of the Erie Railroad system), which operates freight vessels between Buffalo and Chicago that call also at Fairport, Manitowoc, and Milwaukee.

Lehigh Valley Transportation Co. (a subsidiary of the Lehigh Valley Railroad Co.), which operates freight vessels between Buffalo and Chicago, calling also at Manitowoc and Milwaukee.

Mutual Transit Co. (owned by the Mutual Terminal Co., which in turn is jointly owned by the Erie, the Delaware, Lackawanna & Western, the Lehigh Valley, and the New York Central & Hudson River Railroad Cos.), which operates 12 vessels serving Buffalo, Fairport, and Cleveland on Lake Erie, the ports of Gladstone and Green Bay on Lake Michigan; and the ports of Duluth, Hancock, Houghton, Hubbell, Port William, Port Arthur, and West Fort on Lake Superior.

Western Transit Co. (owned by the New York Central & Hudson River Railroad Co.), which operates between Buffalo, Chicago, and Duluth. The vessels of this company call also at Hancock, Houghton, and Milwaukee.

**Commerce of the port.**—The volume and value of the water-borne commerce of the port of Buffalo in the calendar years 1913 and 1914 are indicated in the following tabular statement:[b]

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[a] See, however, pp. 16 and 17.

[b] Report, Chief of Engineers, U. S. Army, 1914, p. 3109; idem, 1915, p. 3296.

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RECEIPTS.

| Routes. | Short tons. | | Value. | |
|---|---|---|---|---|
| | 1913 | 1914 | 1913 | 1914 |
| Lake | 13,193,194 | 9,340,727 | $295,600,416 | $272,607,008 |
| Erie Canal | 720,175 | 351,398 | 12,383,340 | 4,830,374 |
| Total | 13,913,369 | 9,692,125 | 307,983,756 | 277,437,382 |

SHIPMENTS.

| Routes. | Short tons. | | Value. | |
|---|---|---|---|---|
| | 1913 | 1914 | 1913 | 1914 |
| Lake | 5,727,660 | 4,731,893 | $98,362,964 | $71,441,641 |
| Erie Canal | 551,840 | 472,374 | 9,665,298 | 9,118,051 |
| Total | 6,279,500 | 5,204,267 | 108,028,262 | 80,559,692 |

In 1913, which was the more nearly normal trade year and therefore preferable for purposes of discussion, the receipts were more than twice as great as the shipments and the traffic on the Erie Canal formed only about one-sixteenth of the commerce of the port. The portion of the foreign trade carried in vessels was valued at $12,232,415, imports being valued at $8,211,067 and exports at $4,021,348.

The major portion of the lake-borne commerce of the port consists of grain and flour. In the calendar year 1913, 190,143,327 bushels of grain and 9,312,114 barrels of flour, 6,165,188 short tons in all, valued at $212,921,060, were brought by vessel to Buffalo. From the standpoint of tonnage, the next most important items were iron ore, of which 5,833,442 short tons were received, and hard coal, of which 5,033,696 short tons were shipped. From the standpoint of value, the items of greatest importance, next to grain and flour, were general merchandise ($76,285,050), hard coal ($29,698,806), copper ($25,421,448), sugar ($20,678,851), and iron ore ($16,666,976).

The following is a summary of the lake trade at the port of Buffalo in the calendar years 1913 and 1914:[a]

| Commodities. | Short tons. | | Value. | |
|---|---|---|---|---|
| | 1913 | 1914 | 1913 | 1914 |
| Receipts: | | | | |
| Grain and flour— | | | | |
| Wheat | 3,368,976 | 3,013,278 | $107,807,247 | $110,486,850 |
| Oats | 328,922 | 189,739 | 9,250,925 | 5,929,333 |
| Flaxseed | 568,418 | 283,563 | 28,420,938 | 15,595,959 |
| Corn | 530,870 | 400,654 | 12,702,978 | 11,304,172 |
| Barley | 407,650 | 317,500 | 11,040,522 | 8,731,247 |
| Rye | 29,141 | 119,525 | 676,483 | 3,841,864 |
| Flour | 931,211 | 910,075 | 43,021,967 | 45,503,760 |
| Total | 6,165,188 | 5,234,334 | 212,921,060 | 201,393,185 |

[a] Report, Chief of Engineers, U. S. Army, 1914, p. 3109; idem, 1915, p. 3296.

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| Commodities. | Short tons. | | Value | |
|---|---|---|---|---|
| | 1913 | 1914 | 1913 | 1914 |
| Receipts—Continued. | | | | |
| Merchandise | 208,567 | 213,195 | $31,285,050 | $31,979,250 |
| Copper | 81,479 | 85,209 | 25,421,448 | 23,858,520 |
| Iron ore | 5,833,442 | 3,227,873 | 16,666,976 | 8,357,887 |
| Lumber and timber products [a] | 259,050 | 185,217 | 4,982,866 | 3,419,729 |
| Feed | 133,920 | 117,301 | 3,214,087 | 2,932,534 |
| Pig iron | 46,081 | 31,768 | 658,304 | 397,096 |
| Stone | 446,817 | 230,512 | 402,135 | 230,512 |
| Soft coal | 18,650 | 15,318 | 48,490 | 38,295 |
| Total | 7,028,006 | 4,106,393 | 82,679,356 | 71,213,823 |
| Grand total | 13,193,194 | 9,340,727 | 295,600,416 | 272,607,008 |
| Shipments: | | | | |
| Merchandise [b] | 300,000 | 200,000 | 45,000,000 | 30,000,000 |
| Hard coal | 5,033,696 | 4,285,228 | 29,698,806 | 23,997,277 |
| Sugar | 212,870 | 148,226 | 20,678,851 | 16,304,846 |
| Steel rails | 75,171 | 20,896 | 2,255,130 | 605,984 |
| Cement | 66,973 | 31,096 | 418,580 | 223,888 |
| Salt | 38,950 | 46,447 | 311,597 | 309,646 |
| Total | 5,727,660 | 4,731,893 | 98,362,964 | 71,441,641 |

[a] Lumber, shingles, lath, and railroad ties. [b] Estimated.

No data are at hand to show the character of the traffic on the Erie Canal that is handled at Buffalo, but it is believed that grain and lumber are the principal commodities.

The extent of the commerce of the port of Buffalo is indicated further in the following statement of the number and net register tonnage of the vessels that entered and cleared in the calendar year 1913:[a]

| Class of vessels. | Number of vessels. | | | Net register tonnage. | Number of passengers carried. |
|---|---|---|---|---|---|
| | Total. | American. | Foreign. | | |
| Steamer | 9,447 | 6,101 | 3,346 | 19,454,148 | 1,401,706 |
| Sail and barge | 940 | 228 | 712 | 500,373 | ..... |
| Total | 10,387 | 6,329 | 4,058 | 19,954,521 | 1,401,706 |

**Extent and ownership of water front.**—Data compiled by Capt. George H. Norton, deputy engineer commissioner of the city of Buffalo, show that total water frontage available in February, 1915, was 197,400 feet, or about 37.4 miles. Approximately 124,500 feet, or nearly two-thirds of the total frontage, have been improved. The following table prepared by Capt. Norton shows the amount of frontage on the several waterways comprising the port of Buffalo, classified by character of ownership:

[a] Report, Chief of Engineers, U. S. Army, 1914, p. 3108.

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| Character of ownership. | Total. | Lake front. | Erie Basin. | Buffalo River.[a] | City Ship Canal.[b] |
|---|---|---|---|---|---|
| | *Feet.* | *Feet.* | *Feet.* | *Feet.* | *Feet.* |
| Publicly owned— | | | | | |
| City of Buffalo | 13,750 | 11,050 | ..... | ..... | ..... |
| State of New York | 9,950 | 450 | 6,000 | 3,500 | ..... |
| United States | 8,800 | 6,400 | ..... | 2,400 | ..... |
| Total | 32,500 | 17,900 | 6,000 | 5,900 | ..... |
| Privately owned— | | | | | |
| Railroads— | | | | | |
| Buffalo & Susquehanna | 1,850 | 350 | ..... | ..... | ..... |
| Buffalo, Rochester & Pittsburgh | 2,200 | ..... | ..... | 600 | 1,600 |
| Buffalo Creek | 7,900 | 1,800 | ..... | 3,400 | 2,700 |
| Delaware & Hudson | 1,700 | ..... | ..... | 1,700 | ..... |
| Delaware, Lackawanna & Western | 6,300 | ..... | 450 | 4,650 | ..... |
| Erie | 10,150 | 1,500 | ..... | 6,650 | 2,000 |
| Grand Trunk | 1,700 | ..... | 250 | ..... | 500 |
| Lehigh Valley | 19,000 | 6,000 | ..... | ..... | 2,100 |
| New York Central | 14,300 | ..... | 2,200 | 8,500 | 1,400 |
| New York, Chicago & St. Louis | 100 | ..... | ..... | 100 | ..... |
| Pennsylvania | 12,850 | 3,300 | ..... | 2,350 | 3,300 |
| South Buffalo | 100 | ..... | ..... | 100 | ..... |
| West Shore | 1,200 | 1,200 | ..... | ..... | ..... |
| Total | 79,350 | 14,150 | 2,900 | 28,050 | 13,600 |
| Industrial companies | 44,400 | 2,800 | ..... | 20,200 | 1,200 |
| All other private owners | 41,150 | 15,000 | 200 | 11,000 | 2,000 |
| Total | 164,900 | 31,950 | 3,100 | 59,250 | 16,800 |
| Grand total | 197,400 | 49,850 | 9,100 | 65,150 | 16,800 |

| Character of ownership. | Lehigh Valley Basin. | Lackawanna and Union Canals. | Ohio Basin, Peck's, Evans's, and Commercial slips. | Colt, Erie, Niagara, Peacock, and other slips. | Black Rock Harbor. |
|---|---|---|---|---|---|
| | *Feet.* | *Feet.* | *Feet.* | *Feet.* | *Feet.* |
| Publicly owned—City of Buffalo | ..... | ..... | ..... | ..... | 2,700 |
| Privately owned— | | | | | |
| Railroads— | | | | | |
| Buffalo & Susquehanna | ..... | 1,500 | ..... | ..... | ..... |
| Delaware, Lackawanna & Western | 450 | ..... | 750 | ..... | ..... |
| Grand Trunk | ..... | ..... | ..... | 950 | ..... |
| Lehigh Valley | 10,900 | ..... | ..... | ..... | ..... |
| New York Central | ..... | ..... | ..... | 2,200 | ..... |
| Pennsylvania | ..... | 3,900 | ..... | ..... | ..... |
| Total | 11,350 | 5,400 | 750 | 3,150 | ..... |
| Industrial companies | ..... | 14,800 | 1,600 | 950 | 2,850 |
| All other private owners | ..... | ..... | 1,600 | 1,000 | 10,350 |
| Total | 11,350 | 20,200 | 3,950 | 5,100 | 13,200 |
| Grand total | 11,350 | 20,200 | 3,950 | 5,100 | 15,900 |

[a] Including Hatch Slip and Western Slip. [b] Including Buffalo, Rochester & Pittsburgh Ry. Slip.

**Terminals.**—The principal terminals at the port of Buffalo are located on the Buffalo River and on the City Ship Canal and Lehigh Valley Basin. Important terminals are also to be found in the other parts of the harbor.

The following table, which is based on data supplied by the deputy engineer commissioner, shows the improved frontage in the several sections of the harbor, classified by character of use:



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| Character of use. | Total. | Lake front. | Erie Basin. | Buffalo River.[a] | City Ship Canal.[b] |
|---|---|---|---|---|---|
| Public: | *Feet.* | *Feet.* | *Feet.* | *Feet.* | *Feet.* |
| City of Buffalo | 4,700 | 4,700 | ..... | ..... | ..... |
| United States | 6,300 | 3,900 | ..... | 2,400 | ..... |
| Total | 11,000 | 8,600 | ..... | 2,400 | ..... |
| Private: | | | | | |
| Railroad wharves | 3,950 | ..... | ..... | ..... | ..... |
| Steamship wharves | 18,950 | ..... | 150 | 9,050 | 3,300 |
| Grain elevators | 11,050 | 500 | 200 | 5,950 | 2,050 |
| Lumber yards | 8,250 | 2,200 | 550 | 900 | ..... |
| Coal docks | 7,650 | ..... | 1,300 | 750 | 3,550 |
| Iron-ore docks | 16,350 | ..... | 450 | 2,900 | 1,500 |
| Steel plants and furnaces | 13,500 | ..... | ..... | 5,400 | ..... |
| Other industries | 18,000 | 100 | 450 | 11,650 | 2,450 |
| Other private use | 15,800 | 5,500 | ..... | 4,850 | ..... |
| Total | 113,500 | 8,300 | 3,100 | 41,450 | 12,850 |
| Grand total | 124,500 | 16,900 | 3,100 | 43,850 | 12,850 |

| Character of use. | Lehigh Valley Basin. | Lackawanna and Union Canals. | Ohio Basin, Peck's, Evans's, and Commercial slips. | Coit, Erie, Niagara, Peacock, and other slips. | Black Rock Harbor. |
|---|---|---|---|---|---|
| Private: | *Feet.* | *Feet.* | *Feet.* | *Feet.* | *Feet.* |
| Railroad wharves | 450 | 3,000 | ..... | 500 | ..... |
| Steamship wharves | 4,200 | ..... | 750 | 1,500 | ..... |
| Grain elevators | ..... | ..... | 1,150 | 550 | 650 |
| Lumber yards | 2,800 | ..... | ..... | 1,800 | ..... |
| Coal docks | 1,500 | ..... | 250 | 300 | ..... |
| Iron-ore docks | 2,400 | 9,100 | ..... | ..... | ..... |
| Steel plants and furnaces | ..... | 8,100 | ..... | ..... | ..... |
| Other industries | ..... | ..... | 700 | 450 | 2,200 |
| Other private use | ..... | ..... | 1,100 | ..... | 4,350 |
| Total | 11,350 | 20,200 | 3,950 | 5,100 | 7,200 |

[a] Including Hatch Slip and Western Slip. [b] Including Buffalo, Rochester & Pittsburgh Ry. Slip.

*Grain, ore, and coal terminals.*—The terminals that are most important with respect to the tonnage and value of the commerce handled are those used by grain elevator companies. At the close of 1914 there were 15 active elevators in operation, with a total storage capacity of 21,500,000 bushels. The following is a list of the elevators, with the location, railroad connection, storage capacity, and handling equipment of each:

| Elevators. | Owners or agents. | Storage capacity. | Number of legs. | Locations. |
|---|---|---|---|---|
| | | *Bushels.* | | |
| American Malting [a] | American Malting Co. | 2,000,000 | [b] 1 | Buffalo River. |
| Concrete | Eastern Grain, Mill & Elevator Co. | 1,000,000 | [c] 2 | Do. |
| Connecting Terminal Railroad. | Connecting Terminal R. R. Co. | 1,000,000 | [b] 1, [c] 1 | City Ship Canal. |
| Dakota [a] | Buffalo Elevator Co. | 1,200,000 | [c] 2 | Do. |
| Electric [a] | Electric Grain Elevator Co. | 2,000,000 | [c] 2 | Buffalo River. |
| Evans [d] | George E. Pierce | 400,000 | [b] 2 | Evans Slip. |
| Exchange [d] | Exchange Elevator Co. | 500,000 | [b] 1 | Erie Basin. |
| Export [a] | Export Elevator Co. | 1,000,000 | [b] 1 | City Ship Canal. |
| Frontier [a] | Frontier Elevator Co. | 3,000,000 | [b] 1 | Do. |
| Great Eastern [a] | Great Eastern Elevator Co. | 2,250,000 | [b] 1, [c] 1 | Buffalo River. |
| Kellogg (new) [a] | Spencer Kellogg & Sons | 1,000,000 | [c] 2 | Do. |
| Marine [a] | Marine Elevator Co. | 650,000 | [b] 1, [c] 1 | Do. |
| Monarch [d] | A. J. Wheeler | 450,000 | [b] 1 | Evans Slip. |
| Mutual [a] | Mutual Terminal Co. | 2,800,000 | [c] 3 | City Ship Canal. |
| Superior [a] | Superior Elevator Co. | 1,500,000 | [c] 1 | Buffalo River. |
| Wheeler [a] | Wheeler Elevator Co. | 750,000 | [b] 1 | Do. |

[a] Served by Buffalo Creek Railroad. [c] Movable.
[b] Stationary. [d] Served by New York Central & Hudson River Railroad.

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All of the above-named elevators make rail, team, and canal deliveries. In addition, there are a number of inland elevators that have only rail connection.

In recent years the following elevators on the water front have been torn down: Bennett (600,000 bushels), Kellogg A (650,000 bushels), and Wilkeson (400,000 bushels). In addition, the Erie Railroad elevator (700,000 bushels) has been destroyed by fire and the Union elevator (100,000 bushels) is not used, since its operations interfere with the traffic at the hard-coal pier owned by the same company—the Delaware, Lackawanna & Western Railroad. On the other hand, three new elevators have been built—the American Malting, the New Kellogg, and the Superior—with a combined capacity of 5,500,000 bushels, while the capacity of the Frontier elevator has been increased 350,000 bushels.

Second in importance, from the standpoint of tonnage, are the iron-ore docks. The following table contains a list of such docks, together with their location and unloading equipment:

| Owners and operators. | Locations. | Unloading machines. | | | |
|---|---|---|---|---|---|
| | | Type. | Number. | Capacity of buckets. | Capacity per hour. |
| | | | | *Tons.* | *Tons.* |
| Ashtabula & Buffalo Dock Co. | City Ship Canal... | Brown electric..... | 3 | 5 | 750 |
| Buffalo, Rochester & Pittsburgh Ry. | .....do..... | Hulett electric..... | 2 | 10 | 700 |
| Buffalo Union Furnace Co... | Buffalo River..... | Brown bridges..... | 4 | 2½ | (a) |
| | | McMyler bridges..... | 2 | 4 | 500 |
| Lackawanna Steel Co..... | South end of outer harbor. | Hulett hydraulic..... | 1 | 10 | 1,000 |
| | | Hulett electric..... | 4 | 10 | (a) |
| Lehigh Valley R. R..... | City Ship Canal... | McMyler whirlies..... | 2 | 3 | 200 |
| | | Brown..... | 6 | 1 | 200 |
| Pennsylvania R. R.[b]..... | Union Canal..... | Hulett electric..... | 1 | 10 | 250 |
| | | Brown electric..... | 2 | 5 | 400 |
| Rogers-Brown Iron Co..... | .....do..... | Brown..... | 5 | 5 | 430 |
| Wickwire Steel Co..... | Niagara River..... | Hulett electric..... | 1 | 10 | 300 |

[a] Not reported. [b] Operated by South Buffalo Ore Dock Co.

The following is a list of the principal coal docks, together with the location, storage capacity of pockets, and daily shipping capacity of each:

| Owners and operators. | Locations. | Type of dock. | Capacity of pockets. | Daily shipping capacity. |
|---|---|---|---|---|
| | | | *Tons.* | *Tons.* |
| Cargo coal docks: | | | | |
| Delaware, Lackawanna & Western R. R..... | Buffalo River..... | Trestle.. | 4,500 | 10,000 |
| Erie Ry..... | City Ship Canal..... | ...do..... | 10,000 | 3,000 |
| Lehigh Valley R. R..... | Lehigh Valley Basin.. | ...do..... | 12,000 | 6,000 |
| Pennsylvania R. R..... | Union Canal ..... | ...do..... | 3,000 | 2,500 |
| Philadelphia & Reading Ry..... | Erie Basin..... | ...do..... | 6,500 | 7,000 |
| Bunker coal docks: | | | | |
| Buffalo, Rochester & Pittsburgh Ry..... | City Ship Canal..... | ...do..... | 2,500 | ..... |
| Frank Williams & Co..... | .....do..... | ...do..... | 1,500 | ..... |

*Package-freight and lumber terminals.*—The package-freight terminals are to be found chiefly on the lower section of the Buffalo River and on the City Ship Canal and Lehigh Valley Basin. The

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passenger-steamship terminals of the Chicago, Duluth & Georgian Bay Transit Co., the Cleveland & Buffalo Transit Co., the Detroit & Cleveland Navigation Co., the Erie & Western Transportation Co., and the Northern Steamship Co. are located on the Buffalo River. The terminals of the Cleveland & Buffalo Transit Co. and of the Detroit & Cleveland Navigation Co. are equipped to handle a large package-freight business.

The freight terminals of the Erie & Western Transportation Co., and of the Mutual Transit Co. are located on the City Ship Canal, while those of the Lehigh Valley Transportation Co. are located on the Lehigh Valley Basin. The Western Transit Co., which is owned by the New York Central Railroad Co., has access to the warehouses of that company on the Erie Basin and Buffalo River. The vessels of the Erie Railroad Co.'s lake line use the railroad terminals, docks, and warehouses on Buffalo River.

An excellent general description of the methods used in handling package freight at the above-named terminals appears in the special report of the Chief of Engineers on Water Terminal and Transfer Facilities.[a] It reads as follows:

The loading and unloading facilities for package freight are principally those installed at wharves of the railroad lines operating lake steamers and used for transfering freight in barrels, boxes, bales, bags, sacks, crates, and loose articles from steamer to warehouse, or vice versa.

Packages carried in the vessel's hold are hoisted to main deck by block or sheave and tackle, the block or sheave being hung over the hatch from deck beams, or from a steel gallows frame or breast derrick that fits and is secured to the hatch comings. The hoisting is done by the vessel's steam winches.

On vessels having no upper decks, hoisting out of the hold is done by derrick booms and tackle attached to the vessel's masts operated by steam winches.

The handling from main deck to wharf is primarily by hand trucks; but, in aid thereto, moving inclined platforms are installed at each warehouse door to carry loaded hand trucks up the rise of 3 to 4 feet from wharf to warehouse floor.

The moving platforms are about 10 feet long by 3 feet wide, operated by sprocket chains and wheels driven by a belt at each platform connecting with a driving shaft extending along the whole warehouse front above the doors and driven by belt by a steam or gasoline engine at one end of the warehouse. A lever is provided at each platform for throwing its belt on or off. These devices are made up of standard types of 30 to 50 horsepower horizontal engines and moving platforms.

For transferring similar freight from canal boats to lake steamers a steel breast derrick is used. The derrick frame, a part of the steamer's equipment, fits into the sides of its gangway ports, overhanging outboard, and is rigged with a single or double purchase block and tackle operated by one of the steam winches on the vessel. The package when hoisted is swung inboard by tag line.

Transfer from canal boats to wharves is done by steam-power boom derricks, or revolving cranes, installed on the wharf front; from wharf to warehouse by hand trucks. These devices are made up of standard types of hoisting engines and boom derricks and revolving cranes, as illustrated in numerous trade catalogues.

The lumber docks, of which there are a number, are located principally near the inner end of the City Ship Canal and on the Ohio Basin (off the Buffalo River), which is given over almost entirely to a lumber traffic. One important lumber dock is located also on Erie Basin (the McNeil Lumber Co.).

Erie Basin in the outer harbor and Ohio Basin Slip in the inner harbor, which are at present the Buffalo terminals of the Erie Canal, are being greatly improved by the State of New York for use as terminals of the new State Barge Canal.

Ohio Basin and Slip are to be improved by increasing the depth of water to 21 feet and by widening the entrance. At present vessels of

[a] House Document No. 226, Sixty-third Congress, first session, p. 1239.

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more than 255 feet in length or 36 feet in width can not enter the basin. After the present improvements have been made Ohio Basin will be available to vessels having a width of 52½ feet and a length of 406 feet.

Erie Basin, which is formed in the outer harbor by a breakwater 1,810 feet long, will have, when improved, two piers extending from the shore instead of from the breakwater, as was formerly the case. These piers will be 425 feet and 600 feet in length, respectively, and 150 feet in width, with a slip of 250 feet wide between them. Parallel to the breakwater there will be a channel 300 feet wide, which is being improved by the Federal Government and will make a straight and direct connection between the main entrance channel and Black Rock Harbor. This new channel will make the terminals in Erie Basin more accessible to the large lake steamers as well as to the canal boats and will thus facilitate the interchange of freight between lake and canal. The depth of water in Erie Basin will be 23 feet. The work of improvement, which will cost about $1,500,000, is being done by the State of New York.

The only terminals on the canalized channel called Black Rock Harbor are to be found on the eastern side on the narrow strip of land between Black Rock Channel and the Erie Canal.

On the channel through Black Rock Harbor there are no terminals except as the towpath of the Erie Canal on the easterly side provides mooring for canal boats, barges, etc., and for the transfer of freight across the towpath. The existing commercial plants that are located along the towpath and employ water transportation consist of three sand-supply yards, a malt and grain elevator, and a car-wheel foundry.

**Type of wharf construction.**—Practically all of the terminals consist of wharves paralleling the channel or basin. There are several slips, but at present no piers. Most of the wharves are of timber cribwork supported upon piles with sheet-pile retaining walls to hold earth filling back of the cribwork. The warehouses and other terminal structures are constructed upon this earth filling reinforced by additional piles. The new quay-wharf of the Delaware, Lackawanna & Western Railroad is of concrete construction.

**Port administration.**—The port is under the control of the municipality, the administrative authority being vested in the bureau of engineering of the department of public works. The head of this bureau, who is known as the deputy engineer commissioner, and his assistants, have charge of the improvement and dredging of the inner harbor.

The city of Buffalo has expended large sums for the improvement of Buffalo River and for the construction of the City Ship Canal, all of which has been provided out of the general revenues of the city.

**Port charges.**—This subject is well covered by the following extract from a special report of the Chief of Engineers, United States Army.[a]

> These terminals are all owned and operated by corporations and private parties, and each is open to use on equal terms by all-water carriers, in so far as they are suitable and chartered for transporting the class of freight handled there.
>
> The terms and conditions of use are not obtainable, but in general may be said to be allowed for in the freight rate and terms of vessel charter.
>
> There are no public docks in the inner harbor, except the dock covering the foot of Main Street on Buffalo River, a frontage of about 100 feet. This is used during the summer season by excursion steamers free of charge, but under regulations and control of the city harbormaster, practically to the exclusion of use by other vessels.

[a] On Water Terminal and Transfer Facilities (H. Doc. No. 226, 63d Cong., 1st sess.), pp. 1239–1240.

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## CHARLOTTE (ROCHESTER), N. Y.

Charlotte Harbor is the only port on Lake Ontario included in this report. The commerce of Lake Ontario is not extensive at present, and, as a consequence, only a few harbors of prominence are found on the American side. The importance of Charlotte as a port is due almost entirely to the coal-transshipping business conducted by the Buffalo, Rochester & Pittsburgh Railway Co. and to its proximity to Rochester.

Charlotte is a village of about 2,000 inhabitants. It is situated at the mouth of the Niagara River, 59 miles west of Oswego. By a recent act of the New York State Legislature the village of Charlotte will become a part of the city of Rochester on January 1, 1916.

The harbor is located in the Genesee River, which has been dredged to a depth of nearly 20 feet and is navigable for lake vessels for a distance of about 2½ miles above its mouth. There is no outer harbor.

**Railroads.**—Charlotte is served by the Buffalo, Rochester & Pittsburgh Railway and by two divisions of the New York Central Railroad. The former railroad taps extensive soft-coal fields in northwestern Pennsylvania and ships large quantities of coal to Canada and northern New York ports via Charlotte.

**Steamship lines.**—Vessels of the Richelieu & Ontario Navigation division of the Canada Steamship Lines (Ltd.), connect this port with Toronto, Kingston, Brockville, Prescott, and Montreal on the Canadian side and with Clayton and Alexandria Bay on the American side. These vessels operate only in the summer season. The schedule for 1915 shows three sailings in each direction weekly from June 5 to June 19 and from September 13 to September 18, and daily trips in each direction from June 21 to September 11.

The Ontario Car Ferry Co. (Ltd.), maintains a car-ferry service between Charlotte and Cobourg, Ontario. The capital stock of this company is owned jointly by the Buffalo, Rochester & Pittsburgh Railway Co. and the Grand Trunk Railway Co. At Cobourg direct connection is made with the latter railway as well as indirect connection with the Canadian Northern Railway. The Cobourg terminal will also be accessible to the Canadian Pacific Railway as soon as a track connection is made with the Grand Trunk Railway.

The car ferry operates during the entire year for freight service, and carries hard and soft coal, coke, and miscellaneous merchandise on its northbound trips and pulp wood, farm products, ores, and miscellaneous merchandise on the southbound trips. In the summer season a regular passenger business of large proportions is also handled on this car ferry. It is planned to place a second car ferry in operation during the present year (1915).

A considerable proportion of the coal shipments from Charlotte is carried in the freight vessels of the George Hall Co., the Montreal Transportation Co., and various individuals.

**Commerce of the port.**—In the calendar year 1914 the freight traffic by water at Charlotte consisted of 950,279 short tons, valued at $2,895,415. In 1913, which was a more nearly normal trade year, and is therefore preferable for purposes of discussion, it amounted to 73,799 short tons of receipts and 1,358,115 short tons of shipments.

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The total traffic was 1,431,914 short tons, valued at only $4,231,218.[a] The commerce of the port has increased steadily since 1904, when the total tonnage was only 554,212.

More than 90 per cent of the commerce in 1913 consisted of soft coal shipped to Canada or to points on the American shore of Lake Ontario. The shipments also included 13,824 tons of hard coal and 16,558 tons of coke in addition to 10,454 tons of iron and steel and 7,468 tons of pig iron. The principal receipts were pulp wood 39,708 tons, iron ore 18,677 tons, and feldspar 13,413 tons.

A considerable foreign trade is handled at the port of Charlotte. Data for the calendar year 1913 are not at hand, but the statistics compiled by the Bureau of Foreign and Domestic Commerce for the fiscal year ended June 30, 1913, show that the imports from Canada were valued at $2,186,130 and the exports at $4,918,369.

The following is a list of the principal imports and exports at the port of Charlotte, N. Y., during the year ended June 30, 1913:

| | |
|---|---|
| Imports: | |
| Glass and glassware | $546,573 |
| Chemicals, drugs, dyes, and medicines | 165,290 |
| Photographic paper | 125,876 |
| Iron and steel, and manufactures of | 118,387 |
| Seeds | 116,954 |
| Pulp wood | 77,665 |
| All other | 1,035,385 |
| Total | 2,186,130 |
| Exports: | |
| Coal and coke | 2,062,998 |
| Photographic goods | 217,627 |
| Billets, ingots, and blooms of steel | 99,642 |
| Pig iron | 68,183 |
| All other | 469,919 |
| Total | 2,918,369 |

**Extent and ownership of water front.**—Approximately 5 miles of water front are available on the Genesee River, but only a small portion has been developed for water-terminal purposes.

**Terminals.**—The following terminals are to be found at Charlotte:

Coal trestle of the Charlotte Dock Co., which is on the west side of the river about 2½ miles from the harbor entrance and is used exclusively for the shipping of soft coal. It has a shipping capacity of 5,000 tons of coal per day.

Car-ferry slip, owned by the Buffalo, Rochester & Pittsburgh Railway Co. and used exclusively for the transfer of cars between the railroad and the car ferry of the Ontario Car Ferry Co.

Feldspar dock, owned by the Buffalo, Rochester & Pittsburgh Railway Co. This dock is leased to the Pennsylvania Feldspar Co. and is used for unloading feldspar from vessel to car. It adjoins the car-ferry slip owned by this railroad company.

Wharf of the New York Central Railroad Co., located on the west side of the Genesee River about a mile above its mouth. This wharf is about 1,000 feet long and is used chiefly for the transfer of passengers and light freight. It is used by the boats of the Richelieu & Ontario Navigation division of the Canadian Steamship Lines (Ltd.).

The New York Central Railroad Co. owns another wharf which is directly opposite the one just mentioned. It is leased to the Upton Co., which deals in posts, etc.

Yates Coal Co. dock, which is now owned by the Charlotte Dock Co. This dock is no longer in use.

[a] Report, Chief of Engineers, U. S. Army, 1914, p. 3126; idem, 1915, p. 3310.

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**Port administration.**—So far as supervision and control of the port by the village of Charlotte is concerned there is no port administration. Commercial organizations in Rochester look upon Charlotte Harbor as the port of Rochester and are doing much for its development, but of course the city of Rochester as yet exercises no control over harbor matters.

**Port charges.**—*Dockage.*—The only wharf open to the general use of the public is that occupied by the New York Central Railroad Co., which makes the following charges per day for berthing:

| | |
|---|---|
| Vessels of less than 30 feet in length: | |
| Operated for revenue | $1.00 |
| Not operated for revenue | None. |
| Vessels of more than 30 feet in length: | |
| Less than 300 tons | 1.00 |
| 300 to 1,500 tons | 3.00 |
| More than 1,500 tons | 5.00 |

*Wharfage.*—The following charges are made on freight for city delivery that is landed on the wharf of the New York Central Railroad Co.:

| | | |
|---|---|---|
| Automobiles | each | $0.25 |
| Horses and cattle, single | do | .25 |
| Horses and cattle, each additional | do | .15 |
| Horse and wagon | do | .35 |
| Sheep and calves | do | .05 |
| Two horses and wagon | do | .50 |
| Wagons | do | .25 |
| General merchandise | per 100 pounds | .03 |
| Minimum charge | | .15 |

## CHICAGO, ILL.

The city of Chicago has two harbors, which are about 13 miles apart, Chicago Harbor and South Chicago, or Calumet, Harbor. Because of the distance between these harbors and of the marked difference in their character, they are discussed separately in this report. The description of South Chicago Harbor is to be found at pages 401 to 404.

The city of Chicago, the second largest center of population and the most important railroad center in the United States, is situated favorably with respect to water routes despite its inland location. It is located at the mouth of the Chicago River on the west shore of Lake Michigan near its southern extremity and will be connected with the Mississippi River at two points by water routes that are in process of development.

Chicago Harbor has, as indicated on the map opposite this page, an outer and an inner harbor. The outer harbor has been formed by means of breakwaters and dredging at the expense of the Federal Government, but is largely undeveloped. The city has recently completed a long pier on the lake front which, it is believed, marks the beginning of an extensive development of the outer harbor.

The inner harbor consists of the Chicago River, which was originally "a sluggish bayou or creek nearly stagnant during the greater part of the year," and its several branches and forks. The river and its several branches have an aggregate length of about 20 miles, much of which has been improved by the Federal Government and by the Sanitary District of Chicago.

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The parts of the river and its branches improved by the United States have the following lengths:

| | Miles. |
|---|---|
| Main river from end of north pier to junction of branches | 1.58 |
| South Branch and West Fork to Ashland Avenue | 4.08 |
| South Fork of South Branch to Chicago Junction Ry. bridge (east and west arms) | 1.59 |
| North Branch to Belmont Avenue | 5.14 |
| North Branch Canal (Goose Island cut-off) | 1.04 |
| Total | 13.43 |

The main channel of the Chicago River is from 200 to 300 feet wide and has a depth of 21 feet. The North Branch of the river varies in width from 100 to 200 feet and has been dredged to 21 feet as far as Belmont Avenue, which is about 6.7 miles from the end of the north-entrance pier. South Branch has a minimum depth of 20 feet and an average width of 200 feet as far south as Ashland Avenue, which is 5.6 miles from the end of the north pier. At Ashland Avenue there is a turning basin, and the South Branch divides into the West Fork and the South Fork. The West Fork has a width of from 140 to 200 feet and a depth of from 20 to 21 feet from Ashland Avenue to Robey Street. The South Fork for a distance of about 1.4 miles varies in width from 100 to 200 feet, and has a depth of 23 feet. The North Branch Canal, which is a lateral channel to the North Branch of the river, has for the most part a depth of 21 feet and varies in width from 70 to 140 feet.

The Chicago River, with its various branches, flows through the heart of the city and is spanned by 52 bridges and tunneled under at three points. Of the 52 bridges, 38 are used for highway purposes, 9 for railroads, and 1 for an elevated railway, while 2 are combined highway and steam-railroad bridges and 2 are combined highway and elevated-railroad bridges. Fifteen of the bridges are swing bridges, 35 are bascule, and 2 are lift bridges, the new bridges under construction being included in this enumeration.

Because of its situation in the heart of the commercial district of Chicago and because of the large number of bridges crossing it, the Chicago River becomes easily congested and therefore presents many navigation problems. Many of these difficulties, however, are being overcome by the work of the Sanitary District of Chicago, which has made important improvements in the river in its efforts to secure an adequate channel for sanitary purposes.

In the South Branch as far as Robey Street, in the West Fork, the sanitary district has provided an improved channel with a uniform width of 100 feet and a depth of 26 feet that shoals to 16 feet at the dock lines. A minimum river width of 200 feet between dock lines has also been provided. The sanitary district has, moreover, caused the removal of obstructive center-pier bridges, which have been replaced by bascule bridges of not less than 140 feet clear span. The sanitary district has shown remarkable foresight in placing the foundation of these bridges at a depth sufficient for a navigable depth in the river of 30 feet. The bulkheading of the river also is being carried on under the supervision of the sanitary district, this work being done as fast as the properties can be acquired by purchase or condemnation. Much of this work has already been completed.

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**Railroads.**—The city of Chicago is served by the following trunk-line railroads:

Atchison, Topeka & Santa Fe R. R.
Baltimore & Ohio R. R.
Chesapeake & Ohio Ry. of Indiana.
Chicago & Alton R. R.
Chicago, Burlington & Quincy R. R.
Chicago & Eastern Illinois R. R.
Chicago Great Western R. R.
Chicago, Indiana & Southern R. R.
Chicago, Indianapolis & Louisville Ry.
Chicago, Milwaukee & St. Paul Ry.
Chicago & North Western Ry.
Chicago, Rock Island & Pacific Ry.
Chicago, Terre Haute & Southern Ry.
Cleveland, Cincinnati, Chicago & St. Louis Ry.
Erie R. R.
Grand Trunk Ry.
Illinois Central R. R.
Illinois Northern Ry.
Lake Shore & Michigan Southern Ry.
Michigan Central R. R.
Minneapolis, St. Paul & Sault Ste. Marie Ry.
New York, Chicago & St. Louis R. R.
Pere Marquette R. R.
Pittsburgh, Cincinnati, Chicago & St. Louis Ry.
Pittsburgh, Fort Wayne & Chicago Ry.
Wabash R. R.

In addition to the above-listed railroads, mention should be made of a number of belt, short line, and switching roads that provide terminal facilities and coordinate, to a considerable degree, the main lines entering the city. The following is a list of the principal belt-line railroads:

Baltimore & Ohio Chicago Terminal R. R.
Belt Railway of Chicago.
Chicago & Illinois Western R. R.
Chicago Junction Ry.
Chicago River & Indiana R. R.
Chicago Short Line Ry.
Chicago, West Pullman & Southern R. R.
Chicago & Western Indiana R. R.
Illinois Northern Ry.
Manufacturers' Junction Ry.

The belt-line railroads at Chicago are engaged primarily in facilitating the interchange of freight between the eastern and western trunk-line railroads. Only two, the Chicago River & Indiana Railroad and the Chicago Junction Railway, may be said to serve the port, in the sense that they provide facilities for the direct interchange of rail-and-lake freight.

The service performed by the Chicago River & Indiana Railroad may be best described in the following quotation from a report of the United States Army engineer at Chicago: [a]

Each steamship line has its own dock or warehouse, where it unloads its local city freight. The vessels then go to the Chicago River & Indiana Railraod Co.'s dock on the West Fork, South Branch, Chicago River, to discharge their through freight and to receive eastbound carload through freight delivered to them by the western carriers through the medium of the Chicago River & Indiana Railroad Co. This latter railroad company provides very efficient facilities for the interchange of freight. The Chicago River & Indiana Railroad Co.'s terminal facilities are located on the south side of the West Fork, South Branch, west of Ashland Avenue. The terminal consists of one transfer warehouse 803 feet long by 98 feet wide along the east side of a private slip located about 1,600 feet west of Ashland Avenue; one covered platform shed 705 feet long by 15 feet wide along the west side of the same slip; and one shed 970 feet long by 16 feet wide along Drainage Canal, which is a continuation of the West Fork. At these terminals there were handled, during 1911, 513 boats, with an approximate total tonnage of 355,436 tons. These docks or terminals are the point of interchange between all the regular lake carriers and most of the western railroads for through business between points in trunk-line territory, handled by the lake-and-rail lines and points Chicago and westward. The Chicago River & Indiana Railroad Co. at this point has a large switching yard, with a capacity of about 600 cars. They also control car-ferry barge, with a capacity of 8 cars, which plies between this terminal to points down the river, principally at the warehouse at Lake and Fulton Streets.

[a] Special Report of Chief of Engineers, U. S. Army, on Water Terminal and Transfer Facilities (H. Doc. No. 226, 63d Cong., 1st sess.), p. 1022.

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The Chicago Junction Railway provides direct connection between the trunk-line railroads entering Chicago and the lake steamer for the interchange of freight. The interchange of freight between industries located on the Chicago River and its branches and the several railroads serving the city is facilitated by the Chicago Lighterage Co. and the Merchants' Lighterage Co., the former operating one and the latter two lighters.

It is reported that[a]—

In most cases water terminals at Chicago have direct railroad connection with the same territory as that served by boat lines; especially is this so at the dock facilities provided on West Fork. These docks are connected by every rail carrier serving the city of Chicago through the intermediary of the Chicago River & Indiana Railway Co. Business received from the east, through the medium of lake carriers for deliveries within the city of Chicago or vice versa, is handled almost exclusively through these terminals. All business, whether for delivery locally or handled through the city to and from points beyond, is handled on joint rates which are prorated or given percentages. For example, the rates published by the lake-and-rail lines to Chicago include delivery at any industry having a dock frontage or having a switch track within the switching limits of the city of Chicago * * *. In order to make these deliveries, the lake-and-rail lines up to Chicago absorb out of their published through rates the charges of the Chicago River & Indiana Railway Co., or the lighterage charge, and the whole service is performed at the published through rate to Chicago.

**Steamship lines.**—The following table shows the principal lines of steamships that call regularly[b] at the port of Chicago:

| Lines. | Sailings. | Ports of destination. |
|---|---|---|
| Anchor Line (Erie and Western Transportation Co.). | Daily | Milwaukee, Detroit, Cleveland, Buffalo. |
| Benton Transit Co | Daily during fruit season; triweekly during remainder of year. | Benton Harbor. |
| Canada Atlantic Transit Co.[c] | Data not reported | Milwaukee, Port Arthur, Fort William, Depot Harbor. |
| Chicago, Duluth & Georgian Bay Transit. | 1 weekly in summer | Mackinac, Detroit, Cleveland, Buffalo. |
| Do | do | Mackinac Island, Soo, Fort William, Duluth, Georgian Bay. |
| Chicago, Racine & Milwaukee Line | Daily | Racine, Milwaukee. |
| Chicago & South Haven Steamship Co. | Daily except Saturday and Sunday. | South Haven, Saugatuck, Douglas. |
| Erie Railroad Lake Line | 3 weekly | Milwaukee, Fairport, Cleveland, Buffalo. |
| Erie & Michigan Railway & Navigation Co. | | Milwaukee, Duluth, Port Arthur, and other ports. |
| Goodrich Transit Co | 3 weekly in July and August | Milwaukee, Manitowoc, Mackinac Island, and intermediate ports. |
| Do | 1 daily throughout year; 3 additional steamers daily in July and August. | Racine, Milwaukee. |
| Graham & Morton Transportation Co. | 1 daily | Holland. |
| Do | 2 daily | St. Josdph, Benton Harbor. |
| Hill Steamboat Co | Daily | Waukegan, Kenosha. |
| Indiana Transportation Co | Daily except Sunday | Saugatuck, Douglas. |
| Do | Daily | Michigan City. |
| Lehigh Valley Transportation Co | 3 weekly | |
| Northern Michigan Transportation Co. | 3 weekly during summer months. | Mackinac Island. |
| Do | 2 weekly during summer months. | Ludington, Manistee, Frankfort. |
| Do | 1 weekly during summer months. | Ludington. |
| Do | do | Ludington, Manistee, Orekama. |
| Do | do | Orekama, Frankfort. |
| Do | 2 weekly during summer months. | Soo (one to Buffalo also). |
| Northern Steamship Co | 1 weekly | Milwaukee, Detroit, Cleveland, Buffalo. |
| Rutland Transit Co | 2 weekly | Milwaukee, Ogdensburg. |
| Western Transit Co | 1 daily | Milwaukee, Buffalo, etc. |

[a] Special Report of Chief of Engineers, U. S. Army, on Water Terminal and Transfer Facilities (H. Doc. No. 226, 63d Cong., 1st sess.), pp. 1024–1025.
[b] See, however, pp. 16 and 17.
[c] Operated by Grand Trunk Railway System.

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**Commerce of the port.**—The commerce of Chicago Harbor proper has declined in recent years. In the calendar year 1914 it amounted to 3,780,509 short tons, valued at $242,620,046. In the more nearly normal trade year, 1913, which is preferable for purposes of discussion, it amounted to 3,829,442 short tons, valued at $233,516,848.[a]

The decline in tonnage may be accounted for in large part by the increasing tendency to ship grain to the Atlantic seaboard by all-rail routes and by the practical extinction of the lumber industry of southern Michigan. The development of South Chicago Harbor also accounts in part for the decline in the tonnage of Chicago Harbor, since in recent years the former has been selected as a location for important industrial plants. The inadequacy of dock and warehouse facilities in Chicago River, the large number of bridges spanning the river, and the tendency to congestion have also held back the development of the commerce of Chicago Harbor.

Work has already begun on the development of an outer harbor on the lake front, which it is expected will relieve the inner harbor of much of its traffic and allow it to be developed further for commerical purposes.

The most important item in the commerce of Chicago Harbor in 1913 was "miscellaneous merchandise," the value of which ($176,754,150) formed nearly three-fourths of the total value of the commerce of the port in that year. The receipts of this class of commodities amounted to 770,194 short tons, while the shipments were 408,167 tons. Other important items were flour, $11,655,350; sugar, $8,249,120; corn, $7,367,655; wheat, $6,785,382; lumber, $5,957,300; coal, $3,771,785; mill stuff, $3,174,772; and manufactured iron, $3,174,772. From the standpoint of tonnage, the principal receipts were miscellaneous merchandise, coal, lumber, salt, and sugar, while the principal shipments were miscellaneous merchandise, corn, flour, wheat, mill stuff (feed), and oats.[b]

**Extent and ownership of water front.**—It is difficult to state the length of water front available at Chicago Harbor, and this is particularly true with respect to the lake front, or outer harbor, much of which is used for public park and residential purposes.

The inner harbor, including its two main branches, the forks, and the slips, has, it is estimated, 43 miles of available frontage; the outer harbor, a frontage of about 24 miles.

The frontage of the inner harbor is held largely by railroad companies, local steamship lines, and a great number of industries and commercial companies The importance of the holdings of the railroad companies is indicated by the map opposite this page and by the data contained in the following table, which show the linear frontage owned by each railroad in the main section of the Chicago River and of the North and South Branches:

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[a] Report, Chief of Engineers, U. S. Army, 1914, p. 2926; idem, 1915, p. 3150.
[b] Idem, 1914, p. 2926.

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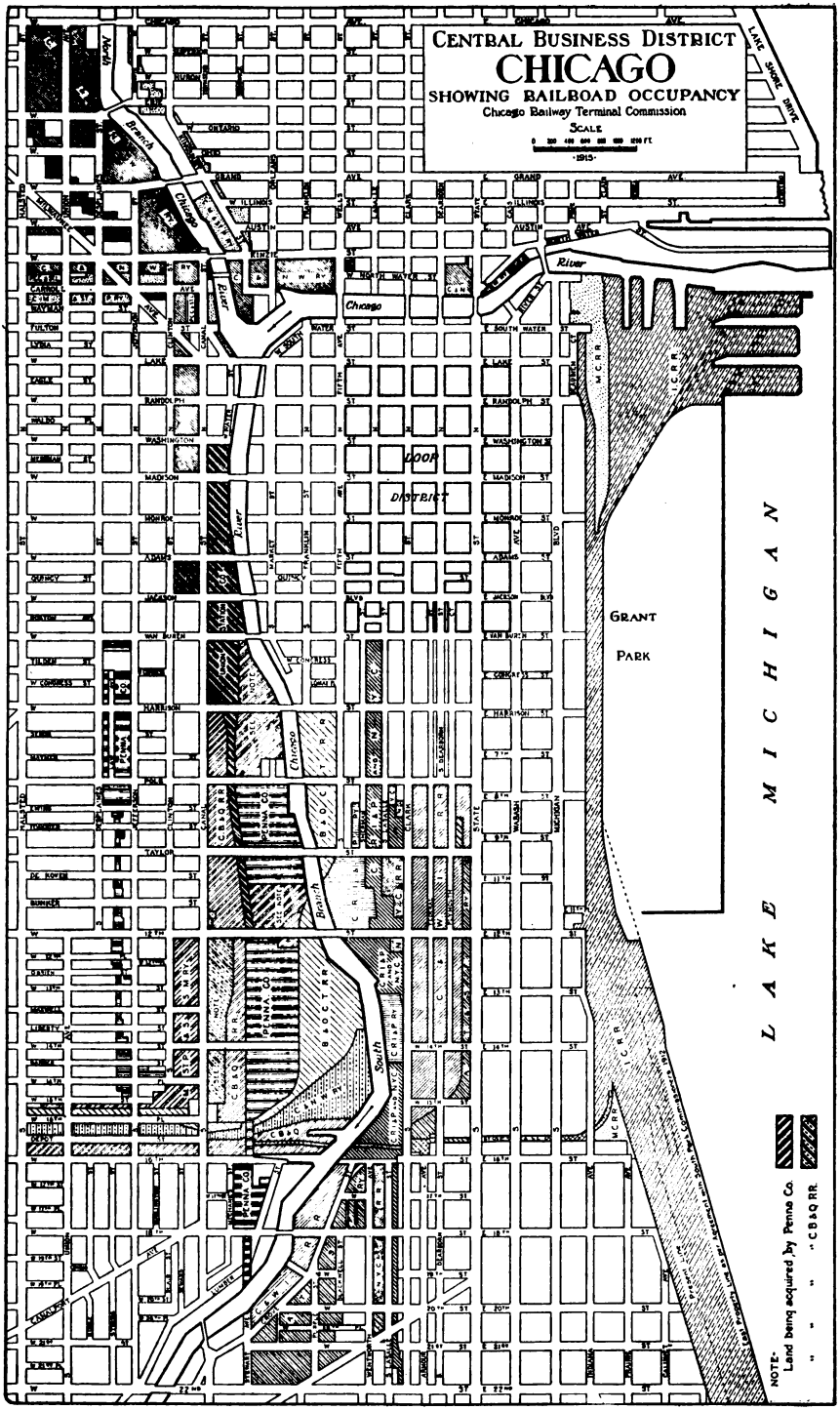


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| Parcel Nos. | Railroads. | Frontage. | Parcel Nos. | Railroads. | Frontage. |
|---|---|---|---|---|---|
| | | *Feet.* | | | *Feet.* |
| 1 | Chicago & North Western Ry | 600 | 23 | Baltimore & Ohio Chicago Terminal R. R. | 800 |
| 2 | do | 1,000 | | | |
| 3 | do | 780 | 24 | do | 810 |
| 4 | do | 180 | 25 | do | 290 |
| 5 | do | 890 | 26 | do | 390 |
| 6 | do | 640 | 27 | do | 1,280 |
| 7 | do | 370 | | | |
| 8 | do | 750 | Total | | 3,570 |
| 9 | do | 1,130 | | | |
| | | | 28 | Chicago, Burlington & Quincy R. R. | 590 |
| Total | | 6,340 | | | |
| | | | 29 | Chicago, Rock Island & Pacific Ry. | 580 |
| 10 | Chicago, Milwaukee & St. Paul Ry. | 700 | 30 | do | 910 |
| 11 | do | 360 | | | |
| 12 | do | 400 | Total | | 1,490 |
| | | | | | |
| Total | | 1,460 | 31 | Chicago, Rock Island & Pacific Ry. and New York Central R. R. (jointly). | 830 |
| | | | | | |
| 13 | Union Station Co | 400 | 32 | do | 1,340 |
| 14 | do | 850 | | | |
| 15 | do | 400 | Total | | 2,170 |
| 16 | do | 400 | | | |
| | | | 33 | Chicago & Western Indiana R. R. | 900 |
| Total | | 2,050 | 34 | do | 300 |
| | | | 35 | do | 690 |
| 17 | Pennsylvania R. R | 870 | | | |
| 18 | do | [a] 520 | Total | | 1,890 |
| 19 | do | 880 | | | |
| 20 | do | 450 | 36 | Michigan Central R. R | 250 |
| 21 | do | 120 | | | |
| 22 | do | 110 | 37 | Illinois Central R. R | 2,400 |
| | | | | | |
| Total | | 2,950 | | | |

[a] Remaining 290 feet to be acquired for railroad purposes.

The city of Chicago owns all the existing street ends on the Chicago River and its several branches, as well as thoroughfares that lie along the water front. The city engineer reports that "a reasonable estimate of the publicly owned dock frontage is about one-eighth of the total improved frontage on the Chicago River, branches, forks, and slips." The sanitary district owns several properties, with a total frontage of about 3,000 feet, most of which have been purchased for widening and straightening the several channels.

A number of docks in the inner harbor are privately owned, but are held subject to a perpetual easement in favor of the public, whereby they are to be kept by the owner in good condition, free of buildings, and available for the landing of passengers with their necessary baggage.

In 1847 and for several years prior thereto much conflict of authority and consequent discontent existed in regard to water lots, or wharfing privileges, as they were called. In the latter year, however, the State legislature passed an act (that of Feb. 27, 1847) for the adjustment of the wharfing privileges, empowering the city of Chicago to adjust and regulate them by city ordinances and court action. To settle this matter definitely another act was passed by the State legislature in 1853. Under these acts the city of Chicago passed certain ordinances vacating or discontinuing certain streets, establishing new streets, fixing certain river lines, and assigning certain values, under approval of the courts, to certain parcels of property that entered into the adjustment of wharfage privileges. Owners under this adjustment acquired title from the city of Chicago, paying as a consideration a part in cash and giving the city a mortgage for the balance of the adjusted price under conditional payment.

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One of the conditions that ran with the land so conveyed by the city to these owners was that a strip 5, and in some cases 10, feet in width and parallel with the river line should remain in perpetuity an open public dock, free of buildings, to be so maintained forever securely planked for the embarking or disembarking of passengers and their necessary baggage.

*The outer harbor.*—Much of the frontage in the outer harbor has been held until recent years by the Illinois Central Railroad Co., and has long been the subject of litigation between the city and the railroad company. As a result comparatively little of the lake front has been developed for purposes of navigation.

A movement for the development of an outer harbor on the lake front was begun as early as 1869, when a bill was introduced in the State legislature authorizing the city of Chicago to develop the lake-front harbor. This bill was passed after it had been amended so as to authorize the Illinois Central Railroad, instead of the city of Chicago, to control the proposed development. Because of public opposition this law was repealed by the legislature in 1873. Litigation then ensued and was not concluded until 1892, when the United States Supreme Court upheld the validity of the repealing act of 1873.

Another obstacle to the development of the lake front lay in the fact that much of the shore-front property was owned and occupied by the Illinois Central Railroad, which acquired the same from the city of Chicago by an ordinance passed June 7, 1852. From time to time, however, agreements have been entered into by the railroad company on the one hand and the city of Chicago and the board of South Park commissioners on the other which have settled disputes as to property rights along the lake front. Thus in 1895 the railroad yielded its claims to the frontage where Grant Park is now situated, but for public-park purposes only. More recently another agreement has been entered into by the same parties that provides for public-park development along the section of the lake front ceded to the railroad company in 1852, that is, between Grant and Jackson Parks, without any provision for the use of this frontage for future harbor purposes, if so required.

The city of Chicago owns more than 8 miles of lake frontage, most of which has been set aside solely for parks and boulevards. Lincoln Park with its connecting boulevards to the north and south has a lake frontage of 4½ miles; Grant Park, about 1¼ miles; the section between Twelfth and Sixteenth Streets that has been reclaimed as a site for the Field Museum of Natural History, a frontage of one-half mile; Jackson Park, about 1½ miles; and Calumet Park, which is near the Calumet River, three-fourths of a mile. None of the frontage occupied by these parks is available for commercial development, and all of this frontage is under the control of the Lincoln and South Park commissioners.

Negotiations are now (August, 1915) pending between the Illinois Central Railroad Co. on the one hand, and the South Park Commission and the city council of Chicago on the other, for the cession by the railroad company of its riparian rights to the frontage between Sixteenth and Thirty-first Streets, which the park commission plans to use for a connecting parkway or boulevard between Grant and Jackson Parks. The Secretary of War refused, in 1914, to grant the park commission a permit to reclaim this frontage on the ground that the city of Chicago had not joined in the application for this

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purpose and that no provision appeared to have been made for the future possible use of this section of the lake front for commercial purposes. The frontage involved is approximately 2 miles in length.

In pursuance of several of the recommendations made by the Chicago Harbor Commission in 1909, the city of Chicago has reserved "that portion of the lake front between the mouth of the Chicago River and Chicago Avenue for future harbor development." This reservation is known officially as "Outer Harbor District No. 1." The city council has, moreover, created five harbor districts along the lake front from the Calumet River on the south to Chicago Avenue on the north. The first district to be developed is district No. 1, extending from the mouth of Chicago River north to Chicago Avenue. The harbor and subway commission is in charge of this work, for which the city of Chicago voted in April, 1912, a bond issue of $5,000,000.

The water front owned by the city of Chicago in addition to the lake frontage used for public park purposes, includes the section of lake front between the mouth of the Chicago River and Chicago Avenue-besides numerous street ends and one or two tracts used by the waterworks and garbage plants. Much of the frontage along the lake is occupied by a high-class residential district.

Just how much of the water front of Chicago Harbor is in use it is difficult to state. The city engineer reports that during the year 1913 the central section of the inner harbor, comprising 39,187 feet on the Chicago River and parts of the North and South Branches, was examined to ascertain the length of frontage actually in use for purposes of commerce. It was found that 18,010 feet, or nearly 46 per cent of that examined, were so used. It is the opinion of the city engineer that 40 per cent would be a fair average for the entire inner harbor.

**Terminals.**—Until the present year (1915) the only publicly owned water terminals consisted of a few small wharves at street ends along the Chicago River and its various branches.

The city has recently completed the first of a series of five piers in harbor district No. 1. This pier, which is located on the lake front a short distance above the mouth of the Chicago River, is 3,000 feet long and 292 feet wide. It is a solid-filled pier with bulkheads of timber piling capped with concrete. Through the center of the pier there is a roadway 80 feet in width on either side of which are two-story sheds 100 feet wide, with a space of 6 feet between the outer wall of the sheds and the edge of the pier. The outer end of the pier for a distance of 645 feet is reserved for boats handling passenger traffic only.

No recent data regarding the water terminals occupied by railroad companies and used for the interchange with lake steamers are available, the latest being those contained in the report of the Chicago Harbor Commission in 1909. The following data, which substantially represents present conditions, are taken from that report:[a]

The Atchison, Topeka & Santa Fe Railway occupies a wharf on a private slip on the South Branch of the Chicago River, 6 miles from its mouth and 3½ miles beyond the wharves of the other western railroads. There is no warehouse, traffic being

[a] Report of Chicago Harbor Commission, 1909, pp. 359–361.

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handled over an open platform 280 feet long, 8 feet wide, and 35 feet from the water's edge. Switching service is performed by the Chicago River and Indiana Railway.

The Chicago & Alton Railroad has a wharf at the foot of Van Buren Street on the South Branch. This wharf has a river frontage of 630 feet and is from 8 to 90 feet wide. A shed 300 feet long and 60 feet wide is used for receiving west-bound freight, while east-bound freight is handled over the open platform direct from cars.

The Chicago & North Western Railroad occupies a dock 800 feet long located between State and Rush Streets. A warehouse 300 feet long and 30 feet wide is used in part for lake traffic.

The Chicago, Burlington & Quincy Railroad occupies a wharf on a private slip on the South Branch of the river. This wharf is small and can not accommodate boats over 320 feet in length because of the narrowness of the river at this point. This wharf has a shed 700 feet long and 45 feet wide which is reserved for west-bound freight and for storage. East-bound freight is handled direct from cars to steamers.

The Chicago Great Western Railroad occupies wharves at the foot of Thirteenth and Harrison Streets on the South Branch. East-bound traffic is handled over two open platforms direct from cars to steamers, while west-bound freight is tracked through empty cars to the city freight house of this railroad.

The Chicago, Milwaukee & St. Paul Railroad has a wharf near the south and north ports, at which point it has also a warehouse about 330 feet long and 60 feet wide.

The Chicago, Rock Island & Pacific Railroad has two wharves on the Chicago River, one at Thirteenth Street and the other at Fifteenth Street. The former has a shed 250 feet long and 40 feet wide; the shed on the latter is 280 feet long and 50 feet wide.

The Illinois Central Railroad has a terminal on a private slip at the mouth of the Chicago River which is used for the interchange of lake and rail freight. This terminal has a shed 600 feet long and 25 feet wide. The east-bound freight is handled direct from cars to boat, while west-bound freight is handled on the floor of the warehouse.

The terminal facilities of the Chicago River and Indiana Railroad Co. were referred to on page 346 as very efficient. These terminals are located on the south side of the West Fork of the South Branch and include one large warehouse and two platform sheds. The warehouse is 803 feet long and 98 feet wide. One shed is 705 feet long and 15 feet wide, the other 970 feet long and 16 feet wide. These terminals include also a large switching yard with a capacity of about 600 cars and a car-ferry float with a capacity of eight cars.

*Principal private terminals.*—The principal private terminals are those occupied by steamship and lighterage companies, lumber and coal companies, and grain elevators. The following table contains a list of the principal steamship terminals on Chicago River as reported by the United States Chief of Engineers in 1913 [a] with the location, frontage, and warehouse capacity of each:

| Name. | Location. | Frontage. | Warehouse capacity. |
|---|---|---|---|
| STEAMSHIP COMPANIES. | | | |
| | | *Feet.* | |
| Chicago & Duluth Transportation Co.... | Main Branch, Randolph Street.. | 400 | 20,000 square feet. |
| Canada, Atlantic Transportation Co..... | Main Branch, mouth of river.... | 750 | 65,000 square feet. |
| Michigan, Indiana & Illinois Line..... | ....do..... | 3,000 | 150,000 tons. |
| | South Branch, Robey Street.... | | |
| | South Branch, Hoyne Avenue.. | | |
| Lehigh Valley Transportation Co..... | Main Branch, east of Rush Street | 326 | 3,500 tons. |
| The Western Transit Co..... | Main Branch, Rush Street..... | 340 | 83,000 square feet. |
| Northern Michigan Transportation Co.. | | | |
| Chicago, Racine & Milwaukee Line..... | | | |
| Benton Transit Co..... | ....do..... | 300 | 60,000 square feet. |
| Hill Steamboat Line..... | Main branch, Ogden Slip..... | 450 | |
| Crawford Transportation Co..... | | | |
| Graham & Morton Line..... | Main Branch, Dock Street..... | 362 | 75,000 square feet. |
| Northern Steamship Co..... | Use Graham & Morton's Dock.. | None. | None. |

[a] Special Report on Water Terminal and Transfer Facilities (H. Doc. No. 226, 63d Cong., 1st sess.), p. 1037 et seq.

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| Name. | Location. | Frontage. | Warehouse capacity. |
|---|---|---|---|
| STEAMSHIP COMPANIES—continued. | | | |
| | | *Feet.* | |
| Chicago & South Haven Steamship Co... | Main Branch, Clark Street..... | 350 | 10,000 square feet. |
| Indiana Transportation Co..... | ....do..... | 310 | 700 square feet. |
| | Main Branch, Illinois Tunnel Freight Dock. | 100 | |
| Anchor Line..... | Main Branch, La Salle Street.... | 500 | 180,000 square feet. |
| Union Steamboat Line..... | South Branch, Washington Street. | 380 | 5,000 square feet. |
| Pacific Dispatch..... | South Branch, Union Street.... | 350 | 8,000 square feet. |
| Rutland Transit Co..... | North Branch, Ontario Street.... | 426 | 140,000 square feet. |
| Erie (Mich.) Ry. Navigation Co..... | No regular dock..... | None. | None. |
| Goodrich Transit Co..... | Main Branch, passengers and freight, Rush Street. | 750<br>350 | 60,000 square feet. |
| LIGHTERAGE COMPANIES. | | | |
| Chicago Lighterage Co..... | North Branch, Chicago Avenue.. | 100 | 7,000 square feet. |
| | Main Branch, Ogden Slip..... | 400 | 35,000 square feet. |
| Merchants Lighterage Co..... | Main Branch, North Water Street. | 300 | 20,000 square feet. |
| | South Branch, Monroe Street.... | | |

Twenty-six lumber companies in 1913 occupied 38,422 feet of wharf frontage, but 16 of these companies, with a total frontage of 4,887 feet, did not receive or ship any lumber by water. Four stone companies occupied yards fronting on the North Branch and on the south fork of the South Branch.[a]

One of the most important terminals is that of the Pugh Terminal Warehouse Co., which occupies 1,350 feet of wharf frontage on Ogden Slip at the mouth of the Chicago River. This company does a general merchandising warehouse business and receives and ships both through and local freight by rail, water, and lighters.

Twelve grain elevators, six public and six private, occupy a total river frontage of 7,277 feet. All of the elevators have rail connections. The total capacity of these elevators is 17,975,000 bushels. The following table[a] shows the grain elevator companies on the water front of Chicago River, with the location and wharf frontage of each elevator:

| Name. | Location. | Frontage. | Kind of elevator. |
|---|---|---|---|
| Armour Grain Co.: | | *Feet.* | |
| A, B, and B Annex..... | North Branch Canal..... | 727 | Public. |
| C elevator..... | South Branch, near Twenty-second Street. | 450 | Do. |
| Central A..... | Main Branch, foot of South Water Street. | 1,290 | Private. |
| Minnesota and Annex..... | North Branch Canal..... | 773 | Do. |
| Santa Fe and Annex..... | ..... | 825 | Do. |
| Union elevator and Annex..... | South Branch, Sixteenth Street..... | 552 | Do. |
| E. R. Bacon, Wabash elevator..... | South Branch, Thirty-third Street..... | 500 | Public. |
| Albert Dickinson Co., Chicago Dock elevator.. | South Branch, Polk and Taylor Streets | 400 | Private. |
| Hooper Grain Co., Atlantic elevator..... | North Branch Canal..... | 170 | Do. |
| J. Rosenbaum Grain Co.: | | | |
| C. S. & L. elevator and Annex..... | South Branch, Halsted Street..... | 740 | Public. |
| Rock Island A..... | South Branch, Thirteenth Street..... | 400 | Do. |
| Central Elevator Co., National elevator..... | South Branch, Wallace Street..... | 450 | Do. |

[a] Special Report of Chief of Engineers, U. S. Army, on Water Terminal and Transfer Facilities (H. Doc No. 226, 63d Cong., 1st sess.), paster sheets following p. 1022.



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More than 2 miles of river frontage are occupied by coal and gas companies. Eleven companies in 1913 occupied 11,417 feet of wharf frontage and had a total storage capacity of 899,000 tons. Seven of the wharves, three belonging to the City Fuel Co. and two owned by the Peoples Gas Light & Coke Co., with a total frontage of 5,509 feet, were not then used for any purpose. The following table [a] contains a list of these wharves with the location, wharf frontage, and storage capacity of each:

| Names. | Location on Chicago River. | Frontage. | Storage capacity. |
|---|---|---|---|
| | | *Feet.* | *Tons.* |
| Fred A. Busse Co | North Branch, North Avenue | 500 | 24,000 |
| City Fuel Co | North Branch, Halsted Street | 530 | 25,000 |
| Do | North Branch, Webster Street | 500 | 40,000 |
| Delaware, Lackawanna & Western Coal Co | North Branch, Division Street | 400 | 55,000 |
| Do | South Branch, Thirty-fifth Street | 660 | 85,000 |
| Eureka Coal & Dock Co | North Branch, Clybourn Place | 550 | 100,000 |
| E. L. Hedstrom & Co | North Branch, North Avenue | 470 | 25,000 |
| Lehigh Valley Coal Co | North Branch, Chicago Avenue | 540 | 30,000 |
| Do | North Branch, Wabansia Street | 570 | 30,000 |
| New Kentucky Coal Co | Main Branch, foot of South Water Street. | 450 | 8,000 |
| Peoples Gas Light & Coke Co | North Branch, Division Street | 490 | 24,000 |
| Do | North Branch, Willow Street | 312 | 33,000 |
| Do | North Branch, canal, Halsted Street | 500 | 40,000 |
| Do | South Branch, Center Avenue | 1,784 | 48,000 |
| Do | South Branch, Fuller Street | 1,508 | 75,000 |
| Do | South Branch, Throop Street | 634 | 13,000 |
| Do | South Branch, Evans Slip | 1,356 | 38,000 |
| Do | South Fork, Archer Avenue | 598 | 14,000 |
| Pittsburg Coal Co | Main Branch, at mouth | 400 | 30,000 |
| Philadelphia & Reading Coal Co | North Branch, canal, Halsted Street | 190 | 23,000 |
| Do | South Branch, Stewart Avenue | 305 | 23,000 |
| O. S. Richardson Coal Co | North Branch, Division Street | 360 | 50,000 |
| Do | South Branch, Halsted Street | 300 | 50,000 |

The foregoing table does not include 7,200 feet of frontage on the west fork of the South Branch held by the Peoples Gas Light & Coke Co.

**Type of wharf construction.**—The prevailing type of wharf is one built with timber-sheet piling and with timber deck about 5 feet above the city datum. The city engineer reports that "there are a few private docks built of concrete piling and concrete in their general construction, and there are several others that are constructed of timber piles sawed off below the water line and the piles capped with a concrete superstructure. The great majority of docks in our harbor, however, are of the old-fashioned type of sheet-pile dock."

**Port administration.**—It is difficult to treat of this subject without referring to a number of boards and officials that have more or less to do with the harbor. The administration of harbor affairs is divided among the city government and three State boards—the Sanitary District, the South Park Commission, and the Lincoln Park Commission.

Under the city government there are at least two departments that have to do with harbor affairs. One is the department of public works and the other is the harbor and subway commission, which was appointed by the city council. Nominally the administration of the port is centered in the department of public works, but the

[a] Special Report of Chief of Engineers, U. S. Army, on Water Terminal and Transfer Facilities (H. Doc. No. 226, 63d Cong., 1st sess.), paster sheets following pp. 1022 and 1037 et seq.

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authority of this department has been greatly curtailed since the State of Illinois has given the Sanitary District a considerable degree of control over the river, primarily for utilizing it for sewage disposal, but also with the idea of developing it as a part of the deep-water route between Lake Michigan and the Mississippi River. Reference has been made to the fact that the Sanitary District has widened and deepened the channels of the Chicago River and of the South Branch and has had center-pier bridges replaced by bascule bridges. The Sanitary District has evidently exercised its power wisely with a view to the development of the inner harbor for purposes of navigation as well as for sanitation.

The work of the South Park Commission, an independent municipal corporation created by the State with power to levy taxes and sell bonds, has not contributed so happily toward the development of the harbor for commercial purposes. It appears that this commission has had in mind almost exclusively the development of the lake front for park and pleasure purposes and has not had the foresight to make provision for the future possible use of this frontage for commercial purposes. The same might be said also of the work of the Lincoln Park Commission.

The harbor work of the department of public works is carried on by a division of bridges and harbors, which is a part of the bureau of engineering, and by the harbor master and his assistants. The city officials employed on harbor work include the following: One assistant engineer (in charge of rivers and harbors), one junior engineer (surveys, etc.), two rodmen (surveys and lines for permits), one messenger (general duties), one harbor master in charge (exercising police powers in furtherance of harbor interests), five assistant harbor masters, one vessel dispatcher, two assistant dispatchers, two telephone operators, nine harbor police, eight dredging inspectors, one launch operator.

The harbor and subway commission was created by ordinance and consists of three members appointed by the mayor subject to ratification by the city council, the State engineer being an ex officio member. This commission, originally called the subway commission, was created for the purpose of building subways, and when the State legislature gave the cities of Illinois the right to build, own, and operate docks and wharves this feature of harbor development was turned over to the subway commission and the name changed to that given above.

The city council has created five harbor districts along the lake front, from Calumet River on the south to Chicago Avenue on the north. Harbor district No. 1, which extends from the mouth of Chicago River north to Chicago Avenue, is the first one to be developed, and the harbor and subway commission were instructed to prepare preliminary plans and drawings for the development of this district. The new municipal pier, known as Pier No. 2, the first to be constructed by the city in the outer harbor, is being built under the supervision and control of the harbor and subway commission. It is very probable that the pier will be operated by the department of public works.

Although the Chicago Harbor Commission, in its report of 1909, called attention in a very forceful manner to the wide diffusion of

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authority and responsibility of harbor affairs in Chicago and made strong recommendations for a concentration of authority, no action has as yet been taken looking toward such concentration.

**Port charges.**—The matter of port charges at Chicago is covered by the following quotation from the special report of the Chief of Engineers, United States Army, on Water Terminal and Transfer Facilities:[a]

As above stated, the water terminals in the Chicago district are not strictly open to use to all water carriers on equal terms, each dock front being considered for private use, no attempt being made to carry on any business not directly connected with their plant or industry. The charges for transporting cargoes from vessels to dock or vice versa are mainly for labor and for use of mechanical appliances, although very few mechanical devices are used except in handling coal and grain. The labor cost varies according to the class of freight, manner of handling, and scale of wages. The charges for grain include receiving, weighing, screening, blowing, mixing, delivery to cars or vessels, etc. The charges at Chicago are 1 cent per bushel for receiving and shipping and 10 days' storage, and one-fortieth of a cent per bushel per day for additional storage.

The lighterage charges on local business is 5 cents per 100 pounds for less than car lots and 3 cents per 100 pounds for car lots. However, these charges are in most cases absorbed by the railroad companies, the Chicago rates as published including cost of such lighterage charges and cost of taking up the business at the different industries having docks and carting it to the railroads for disposition.

Through westbound local freight delivered through the Chicago River & Indiana Railway Co.'s dock house is loaded into cars by that railway company and 15 cents per ton of 2,000 pounds is charged, the rail line receiving the freight for the loading service, except on structural iron, machinery, locomotive tires, and freight paying less than carload rates. On these articles a charge of 35 cents per ton of 2,000 pounds is made. However, on local shipments; that is, to points on connecting lines within the Chicago switching district, loaded into cars by the Chicago River & Indiana Railway Company through their dock house, these charges will be made against the lake line. A trackage charge of 75 cents per car is collected from the lake line on all carload freight, both east and west bound.

## CLEVELAND, OHIO.

Cleveland is located on the south shore of Lake Erie at the mouth of the Cuyahoga River, about 99 miles east of Toledo and 175 miles southwest of Buffalo, and is one of the most important industrial centers in the United States as well as one of the most active harbors on the Great Lakes.

The harbor, as shown by the map opposite this page, consists of two distinct parts—the outer harbor, which has been improved by and is under the control of the United States, and the inner harbor, which is maintained and controlled by the city of Cleveland. The outer harbor has been formed by means of extensive breakwaters constructed by the Federal Government. The inner harbor consists of the Cuyahoga River and its old channel, now known as the "old river bed." The river is at present navigable for a distance of 5½ miles from the lake, and when improvements now under way are completed will have a deep channel 7 miles in length. The old river-bed channel is about 1 mile long.

The channels in the Cuyahoga River and the old river bed have an average width of 200 feet and a minimum depth of 20 feet. The river channel is very tortuous and is crossed by 25 drawbridges, 13 being highway bridges, while 12 are used by railroads. Plans have been made for the elimination of some of the worst bends in the river, and it is expected that the work of elimination will be done in the near future.

[a] Special Report of Chief of Engineers, U. S. Army, on Water Terminal and Transfer Facilities (H. Doc. No. 226, 63d Cong., 1st sess.), p. 1024.

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**Railroads.**—Cleveland is an important railroad center and is served by the following lines: Baltimore & Ohio Railroad; Cleveland, Cincinnati, Chicago & St. Louis Railway; Erie Railroad; Lake Shore & Michigan Southern Railway; New York, Chicago & St. Louis Railroad; Pennsylvania Railroad; and Wheeling & Lake Erie Railroad.

In addition, the Lake Erie & Pittsburgh Railway is building a line between Youngstown, Ohio, and Lorain, Ohio, with a branch to Pittsburgh. This line is being built largely for the iron-ore and coal traffic between Cleveland and Lorain and Pittsburgh.

The several railroads are connected by means of a belt-line railroad, the Cleveland Short Line Railroad, which encircles the city. The Newburg & South Shore Railway, which is owned by the United States Steel Corporation, is merely a short-line railway connecting several plants belonging to this company.

**Steamship lines.**—The following is a list of the principal lines of steamships that call regularly[a] at Cleveland:

| Lines. | Sailings. | Ports of call. |
|---|---|---|
| Canada Steamship Lines (Ltd.)[a] | Not reported | Toronto, Cleveland, Detroit, Port Arthur, Fort William. |
| Chicago, Duluth & Georgian Bay Transit Co.[b] | 1 weekly | Chicago, Duluth, Detroit, Cleveland, Buffalo. |
| Cleveland & Buffalo Transit Co.[c] | 1 daily | Cleveland, Buffalo. |
| | do | Cleveland, Put-in-Bay. |
| Detroit & Cleveland Navigation Co.[c] | do | Cleveland, Detroit. |
| Do | do | Cleveland, Put-in-Bay, Toledo. |
| Erie & Western Transportation Co.[c] | 1 weekly | Buffalo, Cleveland, Duluth, and intermediate points. |
| Erie Railroad Lake Line[a] | | Buffalo, Cleveland, Chicago, and intermediate points. |
| Mutual Transit Co.[a] | | Buffalo, Cleveland, Duluth, and intermediate points. |
| Northern Steamship Co.[b] | 1 weekly | Buffalo, Cleveland, Detroit, Milwaukee, and Chicago. |
| Star-Cole Line[b] | 1 weekly | Cleveland, Sault Ste. Marie. |

[a] Freight service only. [b] Passenger service only. [c] Freight and passenger service.

**Commerce of the port.**—In point of tonnage, the water-borne commerce of this port is exceeded only by that of Duluth-Superior and Buffalo, among the cities on the Great Lakes. In the calendar year 1914 the commerce at Cleveland amounted to 10,912,572 short tons, valued at $50,979,660. In the year 1913, which was a more nearly normal trade year, and is, therefore, preferable for purposes of discussion, it amounted to 16,488,083 short tons, valued at $82,761,622. Receipts were 10,879,610 tons and shipments 5,608,473 tons.[b]

More than 90 per cent of the receipts in 1913 consisted of iron ore, 9,870,093 short tons being received. In 1913 Cleveland received more ore than either Ashtabula or Conneaut, its greatest rivals in this trade. The only other receipts of importance were flux stone (312,016 tons), sand and gravel (247,125 tons), lumber (107,243,036 feet b. m. or 160,864 tons), and miscellaneous merchandise (99,109 tons). In addition, 2,983,637 bushels of wheat, 1,446,231 bushels of oats, and 1,110,836 bushels of flaxseed were received by vessel at Cleveland during the year.

[a] See, however, pp. 16 and 17.
[b] Report, Chief of Engineers, U. S. Army, 1914, p. 3079; idem, 1915, p. 3280.

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More than 90 per cent of the shipments in 1913 consisted of coal, 4,890,176 short tons of cargo coal and 176,431 tons of bunker coal being shipped. Miscellaneous merchandise, of which 228,602 tons valued at $10,202,551 were shipped, was next in importance. The other items were 48,954,748 gallons of oil and 134,845 tons of manufactured iron.

**Extent and ownership of water front.**—Cleveland Harbor has a shore-line frontage of 28.5 miles, 15.5 miles on the lake front and 13 miles on Cuyahoga River and the old river bed. Of the 15.5 miles of lake frontage, the city and Federal Government own 3.5 miles and private parties the remainder. Of the 13 miles of river frontage, the city owns only 0.72 mile.

It has been estimated that the available straight-line frontage on the lake amounts to 13 miles, of which 1.8 miles are used for manufacturing, 2.1 miles for transportation, and 2.9 miles for public parks, while 6.2 miles is undeveloped. A study of the use of the river front shows that 8.62 miles are devoted to commercial purposes and 0.99 mile to noncommercial purposes, 3.39 miles being unused.

**Terminals.**—In the outer harbor there are 10 terminals, including a wharf located at the foot of East Ninth Street and owned by the United States. The outer harbor at Cleveland is used to a greater extent than that of any other port, with the possible exception of Duluth-Superior.

In the west basin of the outer harbor the principal terminal is that of the Pennsylvania Railroad Co., which owns approximately one-half of the frontage and a large area of land that has been made by filling out to the harbor line. This property is used for an ore dock, which is operated by the Ohio & Western Pennsylvania Dock Co. The unloading equipment of this dock, which is the most modern and extensive on the Great Lakes, consists of four Hulett electric unloading machines using 17-ton automatic buckets and handling 3,000 tons of ore per hour. The dock has a storage capacity of 850,000 tons and occupies a frontage of 1,400 feet, 1,000 feet being of modern concrete construction and the balance of timber piling and bulkheads. In the year 1912 the total quantity of ore unloaded at this dock was 3,335,858 tons.

The only other terminal in the west basin is leased by the Great Lakes Dredge & Dock Co. and is used chiefly for storage of equipment used by that company.

The Pennsylvania Railroad Co. has six other terminals in the outer harbor, all of which are located in the east basin within a half mile of the entrance of the river. The title to much of this frontage has long been disputed, but a recent decision of the United States Supreme Court gives the ownership to the city of Cleveland.

Two of these Pennsylvania Railroad wharves are leased to lake transportation companies and three to coal companies; one is occupied by the railroad company itself. The Mutual Transit Co. leases a wharf with a frontage of 850 feet, which is used also by the Northern Steamship Co., and the Erie & Western Transportation Co., a subsidiary of the Pennsylvania Railroad Co., occupies a wharf having 775 feet frontage. These wharves are used exclusively by the vessels of these three companies.

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The coal companies which lease the docks of the Pennsylvania Railroad Co. are engaged exclusively in the shipment of soft coal to upper lake ports. Each of the coal docks is equipped with a mechanical car dumper of the McMyler type that unloads 850 to 900 tons of coal per hour. The Cambridge Collieries Co. shipped 1,505,686 tons in 1912; the Pittsburgh Coal Co., 1,269,752 tons; and James W. Ellsworth & Co., 1,032,583 tons.

Another terminal in the east basin is a lumber dock with 1,207 feet frontage, which is owned by the Lake Shore Saw Mill & Lumber Co. and is used exclusively by this company.

On a part of the lake frontage owned by the city new and modern freight and passenger terminals have recently been constructed for the Cleveland & Buffalo Transit Co. and the Detroit & Cleveland Navigation Co. The city leased to these companies, for a term of 40 years, 735 feet of its lake-front property on condition that they should build a pier 716 feet long and 300 feet wide and improve it by passenger stations and freight warehouses according to plans approved by the city. By the terms of the lease the city agreed to provide proper approaches to the pier, including a bridge over the railroad tracks, a marginal street along the water front, and an extension of the street railway tracks to the pier, the city to be reimbursed by the steamboat companies for all of its expenditures thereon not in excess of $55,000. The entire improvement, it was agreed, should cost not less than $205,000 nor more than $225,000, but it has cost more than $450,000.

Upon two years' notice to the lessee companies, as evidenced by a formal resolution of the city council, the city may cancel the lease and acquire the entire terminals at their actual cost less depreciation at a specified yearly rate. These terminals, which were completed in June, 1915, are not only much more commodious and convenient than the Cuyahoga River wharves formerly used by these companies, but their use will greatly relieve congestion in the inner harbor.

The further development of the outer harbor at Cleveland has been impeded by almost interminable litigation between the city on the one hand and the railroads on the other. The status of riparian rights, the establishment of harbor lines, and similar matters are as yet unsettled. Nevertheless, some excellent principles, as well as plans of proper harbor development, have been evolved from the discussions of these subjects.

One of the most ingenious plans for avoiding the delays and other obstacles of litigation was suggested by Col. John Millis, the United States Army engineer, formerly in charge of harbor improvement in the Cleveland district. Briefly stated, the Millis plan calls for the making of a peninsula 1,000 feet wide, extending at right angles from the large tract of made land in the east basin owned by the city, with a channel 300 feet wide between the peninsula and the shore. This fill would be extended as the commerce of the port demanded additional wharfage and would be provided with slips. The channel along the shore would be dredged to a navigable depth and would be connected with the outer harbor by means of channels cut through the made land. On this land a marginal railroad would be constructed to connect the terminals with the various railroads entering the city.

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No definite steps have as yet been taken toward the accomplishment of the Millis plan, but it has been favorably received by the commercial organizations of the city and its main features are embodied in practically every plan for outer harbor development that has since been made. A notable instance occurred in 1912, when the Otis Steel Co., which owns a large frontage on the lake, made application to the War Department to have a harbor line established in the east basin in order that it might make an extensive fill. The application for the establishment of the harbor line was refused, largely because it would prevent the city from carrying out the Millis plan, and the fill could not be made.

A report on this matter, made April 3, 1912, by the river and harbor committee of the Cleveland Chamber of Commerce, shows how thoroughly the main features of the Millis plan have been incorporated in the harbor policy of the city. Because of its instructive discussion of riparian rights and of the principles of harbor development, the entire report of the committee is presented in the Appendix. (See Appendix B, pp. 424 to 426.)

*Inner harbor terminals.*—Practically the entire frontage on the old river-bed channel is owned by the Pennsylvania, the Erie, and the Baltimore & Ohio Railroad Cos. Eight terminals are located on this channel, four owned by the Pennsylvania Railroad Co. and two each by the other two railroads.

The principal terminal in this part of the inner harbor is the iron-ore dock of the Ohio & Western Pennsylvania Dock Co., which has a frontage, including slips, of 5,500 feet and is leased from the Pennsylvania Railroad Co. This dock is equipped with six Hoover & Mason electric unloading machines using 5-ton automatic buckets and handling 900 tons per hour, 12 Brown electric "fast plant" machines using 1-ton automatic buckets and handling 600 tons per hour, and 31 Brown hoists using 1½-ton automatic buckets and handling 360 tons of ore per hour. This dock has storage space for 850,000 tons of ore and handled 1,579,559 tons in 1912.

The other docks on the old river bed that are owned by the Pennsylvania Railroad Co. are leased to different companies. One, with a frontage of 180 feet, is leased to the Pittsburgh Coal Co.; another, with 450 feet frontage, is leased to a sand and gravel company; and the third is leased to the Great Lakes Towing Co. and is used for coaling tugs.

The Erie Railroad Co. uses both of its docks, one for unloading iron ore and the other for the interchange of freight with various steamship lines. The ore dock has a frontage of 3,000 feet and is equipped with four Brown electric and four Hoover & Mason steam unloading machines, all of which use 5-ton automatic buckets and have a combined unloading capacity of 1,700 tons of ore per hour. The general freight dock has a frontage of 500 feet and is provided with a stationary crane. This dock is provided with extensive freight warehouses and is used by various package-freight vessels. A large quantity of manufactured iron, nails, and wire, as well as package freight, is handled at this dock.

On the old river bed are also located the extensive works of the American Ship Building Co., which has three docks 430 feet, 550 feet, and 340 feet, respectively, in length.

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The old river bed terminals of the Baltimore & Ohio Railroad are of comparatively little importance. One has a frontage of 270 feet and is leased to the Pittsburgh Coal Co. The other, which has a frontage of 800 feet, is leased to the Cleveland Macadam Co., and is equipped with a traveling cantilever crane for unloading sand from barges.

On the Cuyahoga River proper there are 48 wharves, most of which have connections with one or more railroads. Two are owned by the city of Cleveland and one by Cuyahoga County. The three publicly-owned wharves are leased at small rentals to fish companies. Those owned by the city have a frontage of 106 feet and 520 feet, respectively, while the wharf owned by the county has a frontage of only 50 feet.

Two wharves are owned and occupied by steamship companies. The Detroit & Cleveland Navigation Co. wharf has a frontage of 498 feet and was used until June, 1915, as a freight and passenger terminal. The Cleveland & Buffalo Transit Co. owns one wharf 245 feet long, which is used chiefly for passengers, and leases from the Big Four Railroad another dock, 380 feet long, which is used chiefly for freight.

The Erie Railroad Co. owns two terminals on the river front. One is a coal dock and has a frontage of 3,400 feet. It is equipped with a mechanical car dumper of the Wellman-Seaver-Morgan type. In 1912, 1,300,000 tons of soft coal were transferred from car to vessel at this dock. The other terminal has a frontage of 2,300 feet and is used as a lumber wharf.

Five docks on the river are used by blast-furnace plants for unloading iron ore for their own use. One belongs to the American Steel & Wire Co. and has 3,000 feet frontage. The entire dock is of concrete construction and is equipped with two Hulett electric unloading machines using 10-ton automatic buckets, four Hoover & Mason machines using 5-ton buckets, and two Wellman-Seaver-Morgan machines using 2½-ton buckets. Ore can be unloaded at this dock at the rate of 1,200 tons per hour.

The ore dock of the River Dock Co., which serves the blast furnace of the Corrigan-McKinney Co., has a frontage of 2,895 feet and is equipped with three Hulett electric unloading machines using 10-ton automatic buckets and having a capacity of 1,000 tons per hour. The Upson Nut Co. ore dock has a frontage of 1,350 feet and is equipped with one Wellman-Seaver-Morgan unloading machine, which is provided with 5-ton automatic buckets and has an unloading capacity of 200 tons per hour. The Cleveland Furnace Co. occupies two docks, one of which it owns, while the other is leased from the Wheeling & Lake Erie Railroad. The former has a frontage of 1,500 feet and is equipped with two Brown electric unloading machines with 5-ton automatic buckets and two McMyler whirlies with 2-ton buckets. Ore can be unloaded at this dock at the rate of 600 tons per hour. The dock leased from the railroad company has 300 feet frontage, but is in poor condition and is now little used.

Although some of these docks are located several miles from the lake, they are extensively used, despite the slowness and difficulties encountered by large ore vessels in navigating the tortuous channel of the upper river.

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Another important shipping point on the river is the dock of the Standard Oil Co., which is equipped with pumps for pumping oil into vessels. Other important docks are those of the Cleveland Milling Co., which has a grain elevator of 200,000 bushels capacity, and of the Cleveland Grain Co., which has an elevator of 1,000,000 bushels capacity. The latter dock is owned but not operated by the Big Four Railroad. Another active dock is that of the Sherwin-Williams Paint Co., where large quantities of flaxseed are unloaded.

The Pennsylvania Railroad occupies, under perpetual lease from the United States, a portion of the pier on the east side of the entrance channel with a frontage of about 1,208 feet. This dock, which is occupied by freight warehouses and is equipped with a stationary crane, is used for interchange of freight between the railroad and various steamship lines.

The Baltimore & Ohio Railroad Co. owns 1,410 feet of frontage on the west bank of the Cuyahoga River near its mouth. Their wharf is occupied by the Valley Warehouse Co., a subsidiary of the railroad company, and is provided with large warehouses for the storage of freight. The equipment includes two 2-ton magnets for transferring iron and steel products from car to wharf and from wharf to vessel. The railroad company also owns two wharves farther up the river. These terminals have a combined frontage of 1,810 feet and are used for lumber and stone.

The other wharves on the river front include 14 lumber docks, 8 docks used for sand, gravel, brick, cement, and other builders' supplies, and 6 fish docks. Three sand docks are equipped with traveling whirlies, while a cement dock is provided with an endless chain and belt conveyor.

A large extension to the present available river frontage is being made in the upper river valley by a realty company. At its own expense this company is straightening, widening, and deepening the river channel and will provide two turning basins large enough to wind vessels 700 feet in length. This improvement will add 1.6 miles of channel or 3.2 miles of dock frontage and will open up a large area for industrial development.

**Type of wharf construction.**—A few piers are to be found in the outer harbor, but the terminals in the inner harbor consist of wharves that are parallel to the river. Pile-and-timber construction predominates, but concrete is being more largely used for the newer wharves.

**Port administration.**—The administration of harbor affairs is vested in the department of public works and a harbor master, but the limits of administrative authority are not extensive. The harbor master and his assistant enforce the regulations fixed by the city council in regard to the navigation of the inner harbor, the construction and repair of wharves, etc. In the engineering division of the department of public works there is one assistant engineer, known as the harbor engineer, and one draftsman, who give most of their time to engineering work connected with the improvement and dredging of the inner harbor.

A river and harbor commission consisting of five members appointed by the mayor was created by the city council in 1911 but was abolished by an ordinance under date of March 3, 1915. The commission served without pay and acted in a purely advisory capacity, although

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it was required "to consider and report to the mayor and city council on all matters connected with the establishment of such harbor line, the improvement of the outer harbor, and the straightening, widening, and otherwise improving the Cuyahoga River within the city limits." The commission made several studies of harbor conditions, the results of which are embodied in three interesting reports.

**Port charges.**—Little is to be said regarding port charges at Cleveland and other lake ports, since the bulk freighters are accommodated without charge at private docks, while the passenger and package freight boats own or lease their terminals or have free access to railroad wharves.

## CONNEAUT, OHIO.

Conneaut is a city of less than 10,000 inhabitants,[a] but from the standpoint of tonnage it is one of the most important harbors in the country. It is one of the three most important iron ore-receiving ports on the lower Great Lakes and was first in rank in the years 1911 and 1914.

Conneaut is located on Lake Erie at the mouth of Conneaut River, about 74 miles, by water, east of Cleveland. The harbor has been made by the construction of breakwaters in the open lake and of parallel jetties at the mouth of the river and by considerable dredging. The harbor comprises the navigable portion of the Conneaut River, including a slip built by the Pittsburgh & Conneaut Dock Co. The river has a usable depth of 21 feet for a distance of about 3,000 feet from the lake; the slip, which has the same depth, is 1,350 feet in length and 166 feet in width.[b]

**Railroads.**—Conneaut owes its importance as a harbor primarily to the fact that it is the lake terminus of the Bessemer & Lake Erie Railroad, a short-line ore and coal carrying road extending from Lake Erie to the Pittsburgh iron and steel district. This railroad is the only one occupying water-front property at Conneaut, although the city is served also by the Lake Shore & Michigan Southern division of the New York Central Railroad and by the New York, Chicago & St. Louis Railroad.

**Steamship lines.**—No regular line of steamships calls at Conneaut. A daily car-ferry service between Conneaut and Port Stanley and Rondeau, Ontario, is maintained during most of the year by the Marquette & Bessemer Dock & Navigation Co., which is owned jointly by the Bessemer & Lake Erie and the Pere Marquette Railroads.

**Commerce of the port.**—In the calendar year 1914 the water-borne traffic of this port amounted to 8,625,166 short tons, valued at $25,064,766. In the year 1913, which was a more nearly normal trade year and is, therefore, preferable for purposes of discussion, it amounted to 10,783,204 short tons, valued at $36,109,259. The receipts were 8,800,615 short tons and the shipments 1,982,589 short tons. All of the receipts except 9,396 tons consisted of iron ore; all of the shipments except 53,077 tons consisted of soft coal.

The shipments other than soft coal included 18,629 tons of manufactured steel, 14,524 tons of steel rails, 5,421 tons of structural steel,

[a] The population at the census of 1910 was 8,319.
[b] Lake Survey Bulletin No. 24 (April, 1915), pp. 359–360.

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and 12,651 tons of paving bricks, while practically all of the receipts other than iron ore, or 9,341 out of 9,396 tons, were classified as miscellaneous merchandise.[a]

**Extent and ownership of water front.**—Practically the only water terminals at Conneaut are those owned or controlled by the Bessemer & Lake Erie Railroad Co. and its subsidiary, the Pittsburgh & Conneaut Dock Co. These companies own all the property fronting on deep water. In fact, a deep-water channel in the inner harbor is maintained only by the dredging done at the expense of these allied interests. Including the frontage on the slip, which these interests constructed, their holdings have a total frontage of nearly 7,000 feet. The city of Conneaut has acquired some lake frontage which it plans to improve for commercial purposes.

**Terminals.**—There are four wharves used by the Pittsburgh & Conneaut Dock Co., which for convenience may be referred to as docks Nos. 1, 2, 3, and 4.

Dock No. 1 is an iron-ore dock and occupies a frontage of 1,700 feet. It is equipped with nine Brown unloading machines using 1-ton hand-filled buckets and handling 250 tons per hour, and four King steam unloaders using 2-ton automatic buckets and unloading 100 tons per hour. In a recent year 560,000 tons of ore were unloaded at this dock.

Dock No. 2 is also used exclusively for unloading iron ore. It has a frontage of 1,021 feet and is of timber and pile construction. In a recent year 1,120,000 tons of ore were unloaded at this dock, which is equipped with 12 McMyler electric unloading machines using 2-ton automatic buckets and handling 600 tons or ore per hour.

Dock No. 3 has been used for miscellaneous freight but is not now active. This section occupies a frontage of 500 feet and is equipped with five whirlies. The remainder of this dock has a frontage of 600 feet and is used for transferring soft coal from car to vessel. It is equipped with one mechanical car dumper erected in 1914.

Dock No. 4 is also used exclusively for unloading iron ore. It is of concrete construction and has a frontage of about 1,200 feet. This is the most important dock at Conneaut. In a recent year 6,720,000 tons of iron ore were unloaded here. It has a storage capacity of 1,000,000 tons, and its equipment consists of the following machines: One Hulett electric unloader, using 15-ton automatic buckets and handling 300 tons of ore per hour; four Hulett steam unloaders using 10-ton automatic buckets and handling 900 tons per hour; and four Brown electric unloaders, using 5-ton automatic buckets and handling 650 tons per hour.

The terminal used by the car ferries of the Marquette & Bessemer Dock & Navigation Co. occupies a frontage of 300 feet. These ferries transfer freight cars from the Bessemer & Lake Erie Railroad at Conneaut to the Pere Marquette Railroad terminals at Port Stanley and Rondeau in Ontario, Canada. One boat, used as a collier, has a capacity of 55 cars and the other, which is used as a ferry, has a capacity of 30 cars.

**Type of wharf construction.**—The subject of character of wharf construction has been treated in detail in the discussion of terminals.

[a] Report, Chief of Engineers, U. S. Army, 1914, p. 3093; idem, 1915, p. 3288.

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**Port administration.**—Practically the only authority exercised over port affairs at Conneaut is that of the Federal Government through the Secretary of War. The town of Conneaut has made no rules and regulations governing the use of the harbor and does not at present require owners of water-front property to secure permits for the construction of wharves.

**Port charges.**—Little that is of general interest or application can be said about port charges at Conneaut, since it is almost exclusively an iron-ore and coal-transshipping port. The dock company, which is a subsidiary of the Bessemer & Lake Erie Railroad, makes a charge for handling traffic over its docks, but this is a handling charge that is absorbed in the through rate made by the railroad.

## DETROIT, MICH.

The city of Detroit is on the west shore of the Detroit River, a few miles south of Lake St. Clair and 18 miles north of Lake Erie. The city has grown rapidly in recent years and has become one of the leading manufacturing centers in the United States.

The Detroit River has a length of about 31 miles and is a very important link in the chain of Great Lakes and connecting rivers. From Lake St. Clair south to the head of Fighting Island, a distance of about 13 miles, the improved channel in the river is 800 feet or more in width and has a minimum depth of 24 feet. From the head of Fighting Island to the head of Ballards Reef, a distance of about 7 miles, there is a minimum depth of 22 feet and a minimum width on sailing lines of 600 feet. From Ballards Reef to deep water in Lake Erie two channels are provided, (1) the Livingston (downward bound) Channel, which is 22 feet deep and at least 300 feet wide, and (2) the Amherstburg (upward bound) Channel, which is 21 feet deep and at least 600 feet wide. In front of the wharves at Detroit the depth of water ranges from 16 to 27 feet.

On the southern boundary of the city is located the Rouge River, which is about 150 feet wide, has a channel 21 feet deep from the mouth of the river to the first bridge crossing the same, and can be used by boats drawing 13 feet of water for a distance of about 3 miles. The mouth of the river is flanked by large industrial plants, the Solvay Process Co. on the north side and the Detroit Iron and Steel Co. on the south side.

**Railroads.**—Detroit is served by the Canadian Pacific, the Detroit, Toledo & Ironton, the Grand Trunk, the Lake Shore & Michigan Southern, the Michigan Central, the Pere Marquette, and the Wabash Railroads, and also by the Detroit Terminal Railroad, a belt-line railroad which is owned jointly by the New York Central and the Grand Trunk Railway interests. This line encircles the city and intercepts most of the principal railroads that enter Detroit.

**Steamship lines.**—At no port on the Great Lakes is the passenger traffic so large as at Detroit. Chiefly because of its central location and its proximity to Cleveland, Buffalo, and Toledo, and also to numerous summer resorts in St. Clair Flats and northern Michigan, the regular and excursion passenger traffic at Detroit has become very important.

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The following is a list of the principal passenger and package-freight lines that call regularly at the port of Detroit during the season of navigation:

| Lines. | Sailings. | Ports of call. |
|---|---|---|
| Chicago, Duluth & Georgian Bay Transit Co. | 1 weekly [a] | Chicago, Detroit, Buffalo, intermediate points. |
| Detroit & Cleveland Navigation Co. | 1 daily [b] | Detroit, Cleveland. |
| | do. [c] | Detroit, Buffalo. |
| | 4 weekly [d] | Detroit, northern Michigan Points. |
| Northern Steamship Co. | 1 weekly | Buffalo, Cleveland, Detroit, Chicago, Milwaukee. |
| Star-Cole Line | do. [e] | Cleveland, Toledo, Detroit, upper lake ports. |
| White Star Line | 2 daily [f] | Detroit, Toledo. |
| | 3 daily [f] | Detroit, St. Clair Flats, Port Huron. |

[a] June 24 to Aug. 26.
[b] Apr. 1 to Dec. 1.
[c] May 1 to Nov. 1.
[d] Two weekly, Apr. 15 to Dec. 1; and two weekly, June 15 to Oct. 1.
[e] July and August.
[f] June 15 to Sept. 15.

Vessels of the following lake transportation lines, which are owned by trunk-line railroads, call at Detroit: The Erie & Western Transportation Co. (freight and passengers), the Mutual Transit Co. (freight only), and the Western Transit Co. (freight only). In addition, two passenger ferry lines run to cities on the Canadian shore of the river, one to Walkerville and the other to Windsor. Three car-ferry transfers also operate between Detroit and Windsor and are parts of three railroad systems, the Canadian Pacific, the Grand Trunk, and the Pere Marquette, respectively.

**Commerce of the port.**—No satisfactory data are at hand to indicate the tonnage and value of the water-borne commerce of the city of Detroit. Reasonably accurate statistics of the immense commerce passing over the Detroit River, however, are available, and, since they also indicate the immensity of the freight traffic on the Great Lakes, a statement showing the volume of this traffic in the years from 1902 to 1914 is presented herewith: [a]

| Year. | Vessels. | | Estimated freight. | |
|---|---|---|---|---|
| | Number of passages. | Net register tonnage. | Short tons. | Value. |
| 1902 | 33,000 | 39,328,689 | 44,260,506 | $440,834,640 |
| 1903 | 33,113 | 37,453,796 | 46,817,245 | 471,917,830 |
| 1904 | 29,472 | 33,049,984 | 42,792,426 | 453,598,656 |
| 1905 | 35,599 | 45,912,622 | 55,508,360 | 522,888,751 |
| 1906 | 35,128 | 50,673,897 | 63,808,571 | 662,971,053 |
| 1907 | 34,149 | 53,959,769 | 71,226,895 | 697,311,302 |
| 1908 | 27,883 | 40,628,850 | 54,086,750 | 614,425,480 |
| 1909 | 32,296 | 54,668,846 | 67,789,369 | 732,803,079 |
| 1910 | 33,638 | 58,821,282 | 73,526,602 | 771,294,055 |
| 1911 | 30,612 | 52,142,703 | 66,951,231 | 745,167,201 |
| 1912 | 33,675 | 61,606,271 | 78,671,208 | 859,089,591 |
| 1913 | 37,473 | 62,092,149 | 85,376,705 | 927,191,016 |
| 1914 | 31,913 | 52,927,106 | 69,810,853 | 800,032,375 |

An estimate of the portion of the above traffic that was handled over the wharves at Detroit in the year 1911 shows the same to have been approximately 5,500,000 tons of freight, valued at $60,700,000.

[a] Report, Chief of Engineers, U. S. Army, 1914, p. 3053; idem, 1915, p. 3265.

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In addition a large tonnage is handled on the Rouge River, where several large industrial plants are located. On the lower 3 miles of this river the freight movement in the calendar year 1913 amounted to 1,684,742 short tons, valued at $4,401,466 and consisted of gravel and sand, 934,476 tons; iron ore, 406,166 tons; stone, 181,433 tons; oil, 72,677 tons; lumber and lath, 59,990 tons; and pulpwood, 30,000 tons.[a]

The principal part of the water-borne commerce of Detroit consists of general merchandise and iron and steel products, which are handled in large volume by the daily passenger and freight boats plying between Detroit and Buffalo and between Detroit and Cleveland. The assured promptness and dispatch in delivery given by these lines has been a big factor in developing this trade.

Detroit does not share largely in the bulk-freight movement on the Great Lakes. The manufacture of pig iron is not extensive at Detroit, so that comparatively little iron ore is handled. Comparatively little bituminous coal is brought by water, although the manufacturing plants in Detroit consume large quantities of Ohio and West Virginia coal. The city is too close to the coal-shipping ports on Lake Erie to warrant the transshipping of the coal from car to vessel at Toledo, for example, and again from vessel to dock at Detroit, when it can be brought direct by rail at lower cost. A coal company that does a large bunker-coal business on the Detroit River receives all of its coal by rail.

Formerly large quantities of grain were handled at the port of Detroit. In 1879 the receipts of grain were 12,045,000 bushels, and a very large proportion of this went eastward by water. Now practically all the grain received at Detroit is for local consumption. "In 1912 and 1913 not a bushel of grain left its docks in vessels, except a few small cargoes which crossed the river for the use of the distillery in Walkerville."[b]

**Extent and ownership of water front.**—The total length of available water front at Detroit is 74,300 feet, 56,000 feet on the Detroit River and 18,300 feet on the Rouge River. The Federal Government owns 3,150 feet and the city of Detroit 5,300 feet, while the remainder, 65,850 feet, is privately owned. The frontage in actual use comprises 13,600 feet along the Detroit River and 3,800 feet along the Rouge River. It has been estimated, however, that at least 75 per cent of the total available water front could be used economically if the traffic warranted its development.

Of the 65,850 feet of privately owned frontage, 9,618 feet are held by railroad companies, 1,764 feet by steamship companies, and 185 feet by a dock company.

**Terminals.**—Five docks are owned and maintained by the city of Detroit, as follows: (1) Dock at foot of Twenty-fourth Street, 232 feet frontage; (2) waterworks dock, 200 feet; (3) Boulevard Dock, 200 feet; (4) dock at foot of Orleans Street, 150 feet; (5) public lighting-plant dock, 155 feet. All of these docks are operated exclusively for municipal use, except the Orleans Street dock, which is leased to private parties for a term of five years at an annual rental of $3,500.

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[a] Report, Chief of Engineers, U. S. Army, 1914, p. 3042.
[b] The Detroiter (official publication of the Detroit Board of Commerce) Jan. 18, 1915, p. 2.

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Among the private docks, two are used for unloading iron ore. One is owned by the Detroit Furnace Co. and is equipped with two King bridges that use 2½-ton automatic buckets and have an unloading capacity of 150 tons per hour. The other belongs to the Detroit Iron & Steel Co. and is equipped with one Brown and two Wellman-Seaver-Morgan unloading machines using 5-ton automatic buckets and having a combined capacity of 450 tons per hour.

An important coal dock is that of the United Fuel & Supply Co. (Smith's) near the mouth of the Rouge River. This company does a large trade in bunker coal. On the opposite side of the river at Sandwich, Ontario, the Pittsburg Coal Co. and the Mullen Coal Co. have extensive coal docks.

Three grain elevators are located on the water front. The Union, which is owned by the Detroit Union Railroad Depot & Station Co. and has a capacity of 1,250,000 bushels, is at the foot of Fifteenth-and-a-half Street. The Detroit Railroad Elevator, which is owned by the Detroit Railroad Elevator Co. and has a capacity of 600,000 bushels, is located at the foot of Hastings Street. The Michigan Central Railroad Co. formerly had two elevators, each of 500,000 bushels capacity, one known as elevator A, located at the foot of Eighth Street, and the other known as elevator B, at the foot of Twelfth Street. The former was torn down in 1914.

The central portion of the Detroit water front is occupied by the several lake transportation lines. The Detroit & Cleveland Navigation Co. owns frontage between Shelby and Griswold Streets and between Second and Third Streets. All of this frontage is improved by wharves which are provided with large freight warehouses.

The White Star Line occupies 260 feet of frontage on the Detroit River at the foot of Griswold Street. This line owns 200 feet and leases the balance, a street end, from the city of Detroit. This terminal has a freight warehouse with a floor area of about 20,000 square feet and is equipped with an electric crane of 2,000 pounds capacity.

The Erie & Western Transportation Co. owns and occupies frontage at the foot of Cass Street. The Detroit, Windsor & Belle Isle Ferry Co. occupies frontage at the foot of Woodward Avenue.

Considerable frontage is occupied by the railroad for car-ferry landings and general terminals. Sections of the water front are owned by the Canadian Pacific Railway Co., Grand Trunk Railway Co., the Michigan Central Railroad Co., the Pere Marquette Railroad Co., and the Wabash Railroad Co.

A small wharf known as Stevenson's Dock is practically the only terminal open to public use in Detroit Harbor. This wharf, which is located on the Detroit River at the foot of Randolph Street, occupies a frontage of 180 feet and has a warehouse with a floor area of approximately 10,000 square feet. This terminal is used by the steamers of the Chicago, Duluth & Georgian Bay Transit Co., the Mutual Transit Co., the Star-Cole Line, and several small local lines.

Large stretches of water front that are now practically unused for commercial purposes are owned by industrial concerns that formerly received considerable quantities of raw material by water.

**Type of wharf construction.**—The prevailing type of construction is that of pile-and-timber wharves parallel to the river. One of the municipal wharves has a pile foundation and a concrete superstructure.

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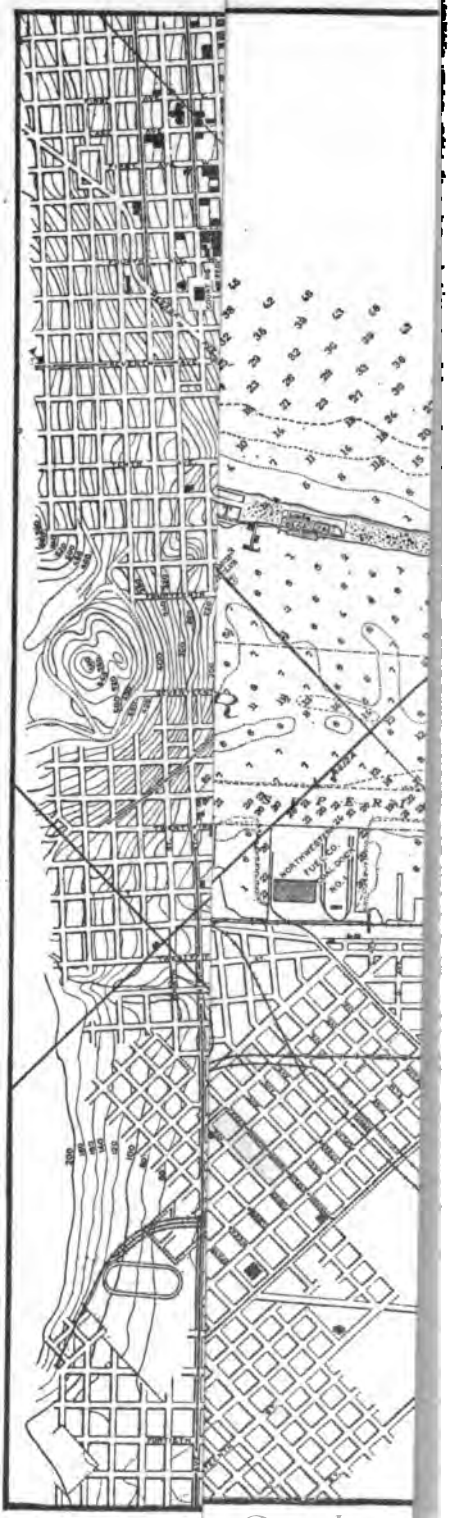

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**Port administration.**—The only official charged with the administration of harbor affairs at Detroit is the harbor master. He and 14 assistants are appointed under civil-service rules by the police commissioner. They perform the customary duties of their office, namely, regulating anchorage of vessels, removing vessels occupying docks without right or consent, and exercising police control and general supervision of harbor affairs.

The docks owned by the city and used for municipal purposes are under the control of the department of public works. The municipal dock, which is leased, is controlled by the board of water commissioners.

**Port charges.**—The only terminal open to the general public is the small wharf known as Stevenson's Dock. A flat charge is made of 40 cents per ton for all freight handled over this wharf, and 10 per cent of the receipts from passenger traffic.

## DULUTH-SUPERIOR, MINN. AND WIS.

In volume of water-borne commerce Duluth-Superior Harbor probably ranks next to New York among the ports of the United States. As an iron-ore shipping port and also as a coal receiving port, Duluth-Superior is by far the most important port in the entire world.

Although Duluth is situated in Minnesota and Superior in Wisconsin, their boundaries adjoin and they use jointly the same general harbor. They form practically one commercial city, and since 1896 they have been considered as one port by Congress in the rivers and harbors appropriation bills.

The importance of the port is due primarily to its proximity to the great iron ranges (Mesabi, Vermillion, and Cuyuna) in St. Louis County, Minn., and to the extensive development of this section in comparatively recent years. Hibbing, which is the center of the great Mesabi Range, is only 84 miles by rail from Duluth. The iron-ore trade has, in turn, been the primary cause of the development of the coal traffic at Duluth-Superior since the ore vessels returning from the lower lake ports carry coal at low rates to secure return cargoes.

Duluth-Superior Harbor is well sheltered and, as shown on the map opposite this page, "includes all navigable waters lying inside of Minnesota Point and along the fronts of the cities of Duluth and Superior to the city limits of each as existing September 25, 1894, embracing the Duluth Canal, Superior Entry, Superior Bay, Allouez Bay, St. Louis Bay, and St. Louis River as far westerly as the bounds of the city of Duluth on the date mentioned." [a] This harbor covers an area of 19 square miles, of which 11 square miles lie within the established harbor lines.

**Railroads.**—The cities of Duluth and Superior are served by the following roads: Chicago & North Western Railway; Duluth & Iron Range Railroad; Duluth, Missabe & Northern Railway; Duluth, South Shore & Atlantic Railway; Duluth, Winnipeg & Pacific Railway; Great Northern Railway; Minneapolis, St. Paul & Sault Ste. Marie Railway; and Northern Pacific Railway.

[a] Lake Survey Bulletin No. 24 (April, 1915), p. 69.



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In addition to the above there is the Interstate Transfer Railway, which is owned by the United States Steel Corporation, and connects the steel mill at Minnesota Point with the ore docks on Superior Bay and with the various railroads entering Duluth and Superior. The United States Steel Corporation also owns the Duluth & Iron Range Railroad and the Duluth, Missabe & Northern Railway, both of which are primarily ore-carrying railroads.

Two of the above-named railroads, the Duluth, South Shore & Atlantic Railway and the Minneapolis, St. Paul & Sault Ste. Marie Railway, belong to the Canadian Pacific system, while the Duluth, Winnipeg & Pacific Railway is part of the Canadian Northern system.

**Steamship lines.**—The following is a list of the principal lines of steamships that call regularly [a] during the season of navigation at the port of Duluth-Superior:

| Lines. | Sailings. | Ports of call. |
|---|---|---|
| Chicago, Duluth & Georgian Bay Transportation Co.[a] | 1 weekly | Chicago, Duluth, and Georgian Bay points. |
| Erie & Western Transportation Co.[b] | 3 weekly | Buffalo, Cleveland, Duluth, and intermediate points. |
| Mutual Transit Co.[c] | do | Do. |
| Northern Navigation Co.[b] | do | Duluth and Port Arthur, Fort William, Sault Ste. Marie, and Sarnia. |
| Port Huron & Duluth Steamship Co.[b] | 2 weekly | Duluth, Houghton, Hancock, and Port Huron. |
| United States & Dominion Transportion Co.[b] | do | Duluth, Grand Marais, Isle Royal, and Port Arthur. |
| Western Transit Co.[c] | 3 weekly | Buffalo, Duluth, Chicago, Milwaukee, and intermediate points. |

[a] Passenger traffic only. [b] Freight and passenger traffic. [c] Freight traffic only.

**Commerce of the port.**—The calendar year 1913 is the latest normal trade year and it is, therefore, preferable for purposes of discussion. In that year the tonnage of cargo handled at the port of Duluth-Superior amounted to 46,875,416 short tons and the value to $352,595,577. All of this traffic was handled in a period of approximately eight months, which is the average length of the season of navigation. The major portion of the commerce, measured both by tonnage and by value, was handled over the docks and wharves in the Superior section of the harbor. Approximately three-fourths of the tonnage of the port was outbound and consisted very largely of iron ore. The shipments of iron ore in 1913 amounted to 30,186,797 short tons, or a little less than two-thirds of the total tonnage inbound and outbound. Shipments of grain, flour, flax, copper, lumber, and shingles also were large.

More than nine-tenths of the inbound traffic of the port in 1913 consisted of soft and hard coal, 8,947,513 short tons of soft coal and 2,044,156 tons of hard coal being received during the year. In point of value, general merchandise was a more important item than coal, the value of the former being $50,120,775 while the value of the latter was only $42,852,352. Other important receipts were manufactured iron, $8,526,708; oil and petroleum products, $6,843,767; and machinery, $2,225,250.

[a] See, however, pp. 16 and 17.

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Further details regarding the tonnage and value of the commerce of the port in 1913 are shown in the following table: [a]

| Commodities. | Duluth. | | Superior. | | Total. | |
|---|---|---|---|---|---|---|
| | Short tons. | Value. | Short tons. | Value. | Short tons. | Value. |
| RECEIPTS. | | | | | | |
| Coal: | | | | | | |
| Soft | 3,404,657 | $11,405,601 | 5,542,856 | $18,568,568 | 8,947,513 | $29,974,169 |
| Hard | 363,286 | 2,288,702 | 1,680,870 | 10,589,481 | 2,044,156 | 12,878,183 |
| Total | 3,767,943 | 13,694,303 | 7,223,726 | 29,158,049 | 10,991,669 | 42,852,352 |
| Oil and petroleum products | 526 | 28,919 | 201,862 | 6,814,848 | 202,388 | 6,843,767 |
| Iron manufactures | 130,955 | 4,714,380 | 105,898 | 3,812,328 | 236,853 | 8,526,708 |
| General merchandise | 151,373 | 34,058,925 | 71,386 | 16,061,850 | 222,759 | 50,120,775 |
| Salt | 49,528 | 158,490 | 39,367 | 125,974 | 88,895 | 284,464 |
| Cement | 56,515 | 519,938 | 24,523 | 225,612 | 81,038 | 745,550 |
| Sand and gravel | 148,500 | 98,671 | 63,240 | 41,311 | 211,740 | 139,982 |
| Limestone | 47,353 | 63,927 | 16,322 | 22,035 | 63,675 | 85,962 |
| Ties and posts | 1,738 | 11,290 | 1,072 | 6,241 | 2,810 | 17,531 |
| Poles | 1,084 | 14,130 | 1,862 | 24,277 | 2,946 | 38,407 |
| Machinery | 702 | 263,250 | 5,232 | 1,962,000 | 5,934 | 2,225,250 |
| Fish | 4,891 | 352,152 | 252 | 18,144 | 5,143 | 370,296 |
| Lumber | 4,100 | 53,294 | 1,953 | 25,389 | 6,053 | 78,683 |
| All other | 23,045 | 837,686 | 20,660 | 750,991 | 43,705 | 1,588,677 |
| Total receipts | 4,388,253 | 54,869,355 | 7,777,355 | 59,049,049 | 12,165,608 | 113,918,404 |
| SHIPMENTS. | | | | | | |
| Grain: | | | | | | |
| Wheat | 1,008,038 | 29,080,591 | 1,189,104 | 34,308,777 | 2,197,142 | 63,389,368 |
| Barley | 16,616 | 387,820 | 305,575 | 7,333,356 | 322,191 | 7,721,176 |
| Oats | 36,002 | 827,026 | 121,797 | 2,910,786 | 157,799 | 3,737,812 |
| Rye | 5,741 | 119,619 | 28,205 | 576,491 | 33,946 | 696,110 |
| Corn | ..... | ..... | 16,123 | 385,790 | 16,123 | 385,790 |
| Total | 1,066,397 | 30,415,056 | 1,660,804 | 45,515,200 | 2,727,201 | 75,930,256 |
| Iron ore | 13,660,993 | 35,738,133 | 16,525,804 | 43,232,683 | 30,186,797 | 78,970,816 |
| Flour | 246,358 | 10,808,763 | 413,734 | 18,145,150 | 660,092 | 28,953,913 |
| Flax | 243,890 | 11,821,847 | 228,582 | 11,279,606 | 472,472 | 23,101,453 |
| Copper | 20,594 | 6,227,640 | 19,600 | 5,892,072 | 40,194 | 12,119,712 |
| General merchandise | 24,490 | 5,510,250 | 13,082 | 2,943,450 | 37,572 | 8,453,700 |
| Lumber | 451,319 | 5,867,141 | 2,805 | 36,465 | 454,124 | 5,903,606 |
| Shingles | 50,177 | 1,605,664 | 48,674 | 1,557,568 | 98,851 | 3,163,232 |
| Wool | 887 | 390,280 | 1,340 | 589,600 | 2,227 | 979,880 |
| All other | 18,484 | 671,893 | 11,794 | 428,712 | 30,278 | 1,100,605 |
| Total shipments | 15,783,589 | 109,056,667 | 18,926,219 | 129,620,506 | 34,709,808 | 238,677,173 |

The corresponding figures for the total commerce of Duluth-Superior in 1914 were as follows: [b]

| Commodities. | Short tons. | Value. | Commodities. | Short tons. | Value. |
|---|---|---|---|---|---|
| RECEIPTS. | | | SHIPMENTS. | | |
| Cement | 75,619 | $623,857 | Barley | 242,673 | $5,759,201 |
| Coal: | | | Copper, electric | 38,385 | 9,451,912 |
| Hard | 1,625,129 | 9,507,005 | Corn | 17,762 | 456,731 |
| Soft | 7,863,168 | 25,162,137 | Flax | 197,893 | 10,128,129 |
| Fish | 7,695 | 489,402 | Flour | 605,602 | 30,131,669 |
| General merchandise | 202,070 | 48,496,800 | General merchandise | 19,332 | 4,639,680 |
| Gravel | 141,951 | 117,109 | Iron ore | 19,225,904 | 44,288,244 |
| Limestone | 55,106 | 77,148 | Lumber | 327,396 | 4,037,884 |
| Farm implements | 1,351 | 756,560 | Oats | 126,297 | 3,321,396 |
| Manufactured iron | 172,803 | 5,978,984 | Rye | 138,452 | 4,373,851 |
| Oils | 205,443 | 5,406,908 | Shingles | 79,622 | 2,468,282 |
| Poles, posts, ties | 6,970 | 83,719 | Wheat | 1,878,056 | 66,799,075 |
| Salt | 94,577 | 260,087 | Wool | 2,412 | 1,254,240 |
| Sand | 105,097 | 63,058 | All other | 19,426 | 706,135 |
| All other | 59,513 | 2,163,757 | Total | 22,919,212 | 187,816,429 |
| Total | 10,616,492 | 99,186,531 | | | |

[a] Report, Chief of Engineers, U. S. Army, 1914, pp. 2846-2847.
[b] Idem, 1915, p. 3096.

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**Extent and ownership of water front.**—The best available figures on the extent of the Duluth-Superior water front are those contained in the Special Report of the United States Army Engineers on Water Terminal and Transfer Facilities,[a] which was issued in 1913. This report states that the harbor lines established by the United States have a total length of 49 miles and that the entire harbor lines cover an area of 19 square miles. The area lying within the harbor lines and available for wharves and slips covers 8 square miles, of which "now only about 1 square mile is occupied by wharves."[a]

About 22 per cent of the entire frontage is owned by railroad companies, less than 1 per cent by the cities of Duluth and Superior, and the remaining 77 per cent by various industrial and commercial corporations and private individuals.[a]

Railway companies own the greater portion of the most accessible and convenient frontage. The city of Duluth owns no frontage except a few street ends, but the city of Superior owns about 3 miles of frontage, including four parcels of property abutting on Superior Bay which have a total frontage of 2,280 feet and an area of about 90 acres.

**Terminals.**—The principal terminals at Duluth-Superior Harbor are the ore docks or trestles. Four of the ore docks, those of the Duluth, Missabe & Northern Railway, are located on the Duluth side and the remainder on the Superior side of the harbor. The following is a list of these docks, with the dimensions and capacity of each:

| Ore docks. | Length. | Width. | Height.[a] | Number of pockets. | Storage capacity. | | Character of construction. |
|---|---|---|---|---|---|---|---|
| | | | | | One pocket. | Dock. | |
| Duluth, Missabe & Northern Ry.: | *Feet.* | *Feet.* | *Feet.* | | *Tons.* | *Tons.* | |
| No. 2 | 2,336 | 49 | 57.5 | 384 | 100 | 38,400 | Timber. |
| No. 3 | 2,304 | 59 | 67 | 384 | 150 | 57,600 | Do. |
| No. 4 | 2,304 | 57 | 72.5 | 384 | 200 | 76,800 | Do. |
| No. 5 | 2,304 | 56 | 80.5 | 384 | 350 | 134,400 | Steel and concrete. |
| Great Northern Ry.: | | | | | | | |
| No. 1 | 2,244 | 62.7 | 73 | 374 | 300 | 112,200 | Timber. |
| No. 2 | 2,100 | 62.7 | 73 | 350 | 300 | 105,000 | Do. |
| No. 3 | 1,956 | 62.7 | 73 | 326 | 300 | 97,800 | Do. |
| No. 4 | 1,812 | 62.5 | 75 | 302 | 300 | 90,600 | Steel and concrete. |
| Northern Pacific Ry. | 684 | 57.2 | 80 | 102 | 350 | 35,700 | Do. |
| Minneapolis, St. Paul & S. Ste. Marie Ry. | 1,800 | 58 | 78 | 300 | 300 | 90,000 | Timber. |

[a] From water to deck of dock.

The ore is brought from the mines in steel-hopper cars holding upward of 50 tons each. These cars are run out on the docks, which are trestlelike extensions of the railroad, and the ore is dumped into pockets, each of which has a storage capacity of from 100 to 350 tons of ore. Some cars of the latest type can be dumped by one man in 15 seconds. The largest docks have 192 pockets on either side and it is possible to load as many as four or five large ore vessels at one time. The pockets of the Duluth, Missabe & Northern Dock

[a] House Document No. 226, Sixty-third Congress, first session, p. 1007.

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No. 5 have a total storage capacity of 134,400 tons and can, therefore, hold enough ore to fill a dozen vessels of the largest type.

The ore flows into the vessels by gravity through spouts. The vessels used for carrying ore are of special type, being steel steamers 500 to 600 feet in length with 60-foot beam and 20-foot draft. The boilers and engines are placed in the stern and the pilot house and crew's quarters in the bow, while the intervening space is open and is divided into 24 to 38 hatches.

Remarkable dispatch has been attained in the loading of ore vessels. A writer in the "A B C of Iron and Steel" reports that "the steamer *William E. Corey*, of the fleet of the Pittsburgh Steamship Co., loaded 10,111 gross tons of ore in 39 minutes on October 10, 1909, at Two Harbors, Minn. The loading began at 2.17 p. m. and ended at 2.56 p. m. This record was broken by the same steamer at Allouez Dock, Superior, on September 8, 1911, when 9,457 gross tons of ore were loaded in 25 minutes, or 378 tons per minute. The *Corey* arrived at Allouez Dock at 1.40 p. m. and was ready to load with water out at 2.43 p. m. Loading began at 2.43 p. m. and was concluded at 3.08 p. m. She left the dock at 3.15 p. m. The total time loading was 25 minutes and the total time at dock and in port was 1 hour and 35 minutes."

*Coal docks.*—The port of Duluth-Superior has 24 coal docks, which received, in the calendar year 1913, 8,947,513 short tons of bituminous coal and 2,044,156 short tons of anthracite. The large volume of coal traffic handled at this port is to be accounted for, in part, by the low transportation cost from the lower lake ports and by the reduced cost of handling coal at the shipping and at the receiving docks. It has been estimated that the cost of handling coal at the docks at Superior has decreased in recent years from 40 cents to 10 cents a ton. About two-thirds of the coal traffic of the port is handled on the Superior side. The coal docks are equipped with large electrically operated clamshells which have a capacity of 3 to 12 tons per trip. As a rule, each dock is equipped with three or four hoists and each hoist has a grab bucket of from 2 to 6 tons capacity.

Most of the coal is shipped by rail to interior points and usually in box cars which bring grain to this port from the interior. From 25 to 40 tons are loaded into each car. The cars have side doors, and the spreading of the coal over the floor is accomplished at some of the docks by special car-loading devices. Some of these devices can load 44 short tons of coal into a box car in a period of 5 to 10 minutes. This work formerly required the services of a crew of eight men working one hour. One device, called the Smith cradle loader, which can be operated by one man and will load 50 to 100 cars in a day, tilts the car to an angle of about 45 degrees, first in one direction and then in the other, to allow the coal to run over the entire floor of the car.

The following list of coal docks at Duluth and Superior was compiled from Mitchell & Co.'s Marine Directory of the Great Lakes (1914 edition) and shows the equipment, handling, and storage capacities of the various docks.

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| Coal docks | Number and kinds of machines. | Capacity of buckets. | Handling capacity of dock. | Storage capacity. |
|---|---|---|---|---|
| DULUTH. | | *Tons.* | *Tons per hour.* | *Tons.* |
| Berwind Fuel Co. | 3 Dodge bridges | 5½ | 1,000 | 1,000,000 |
| Boston Coal Dock & Wharf Co. | 4 Brown hoists | 1½ | 300 | 315,000 |
| | 2 Wellman Seaver | 2 | | |
| Carnegie Coal Co.: | | | | |
| Bituminous dock | 2 Mead-Morrison | 7 | 600 | 600,000 |
| Anthracite dock | do | 3½ | 500 | 150,000 |
| Clarkson Coal & Dock Co. | 1 Watson plant | 3 | 300 | 275,000 |
| | 4 Brown hoists | 1 | 200 | |
| Cutter, D. G. & Co. | 4 steam A-shape rigs | ¾ | 140 | 20,000 |
| Duluth, Missabe & Northern Railway Co. | 3 Mead-Morrison (electric) | 2 | 450 | 315,000 |
| Island Creek Coal and Dock Co. | 2 Heyl & Patterson | 6 | 600 | 1,000,000 |
| North Western Fuel Co. | 18 fixed masts | (a) | 250 | 60,000 |
| Pittsburgh Coal Co.: | | | | |
| Dock No. 1 | 10 Pittsburgh rapid bridges | 1 | 500 | 200,000 |
| Dock No. 7 | 3 Brown hoists | 5½ | 800 | 600,000 |
| Zenith Furnace Co. | 4 Mead-Morrison | 1¼ | 500 | 300,000 |
| SUPERIOR. | | | | |
| Berwind Fuel Co. | 4 Dodge rigs | 3 and 4 | 800 | 500,000 |
| Carnegie Dock & Fuel Co. | 2 Heyl & Patterson | 5 and 6 | 400 | 500,000 |
| Great Lakes Coal & Dock Co. | 6 rigs | (a) | 250–300 | (a) |
| Hanna, M. A., Dock Co. | 3 Mead-Morrison | 1 | 500 | 400,000 |
| Island Creek Coal & Dock Co. | 3 Brown hoists | 1 and 1½ | 200 | 140,000 |
| Lehigh Valley Coal Sales Co. | 3 McMyler, 3 Bogel | 1 and 1½ | 500 | 150,000 |
| Northern Salt Co. | 2 rigs | ¾ | 50 | 9,000 |
| Northern Coal & Dock Co. | 3 Mead-Morrison | 2 | 400 | 300,000 |
| Northwestern Fuel Co.: | | | | |
| Dock No. 1 | 1 Heyl & Patterson | 10 | 500 | 600,000 |
| | 4 Brown towers | 2 | 500 | |
| | 2 Heyl & Patterson | 2 | 600 | |
| Dock No. 2 | 3 Heyl & Patterson | 6 | 1,000 | 550,000 |
| Dock No. 3 | 17 fixed masts | 1 | 350 | 90,000 |
| Philadelphia & Reading Coal & Iron Co. | 4 electric rigs | 5 | 800 | 400,000 |
| Pittsburgh Coal Co. | 2 Brown hoists | 5½ | 500 | 500,000 |
| | 40 stationary | 1 | 400 | |
| Reiss Coal Co. | 4 movable bridges | 1 | 450 | 155,000 |
| | 1 Heyl & Patterson | 8 | | |
| | 3 Wellman, Seaver, & Morgan | 2 | 180 | 150,000 |
| St. Paul & Western Coal Co. | 5 Hunt rigs | 1 | 300 | 235,000 |

(a) Not reported.

*Grain elevators, etc.*—The following is a list of grain elevators in Duluth and Superior, with the storage capacity of each, as compiled from the annual report of the Duluth Board of Trade for the calendar year 1914:

| Names of elevator companies and of elevators. | Storage capacity. | Names of elevator companies and of elevators. | Storage capacity. |
|---|---|---|---|
| DULUTH. | | SUPERIOR. | |
| Capitol Elevator Co.: | *Bushels.* | | *Bushels.* |
| Elevator 4 | 900,000 | American Milling Co. | 150,000 |
| Elevator 5 | 600,000 | Duluth-Superior Milling Co. | 400,000 |
| Consolidated Elevator Co.: | | Globe Elevator Co.: | |
| Elevator B | 1,000,000 | Elevator 1 | 800,800 |
| Elevator C | 1,200,000 | Elevator 2 | 1,850,000 |
| Elevator D | 2,300,000 | Elevator 3 | 1,850,000 |
| Elevator E | 1,300,000 | Great Northern Elevator Co.: | |
| Elevator F | 1,400,000 | Elevator X | 1,500,000 |
| Elevator G | 1,600,000 | Elevator S and annex | 5,500,000 |
| Elevator H | 1,200,000 | Itasca Elevator Co. | 1,250,000 |
| Duluth Universal Milling Co. | 25,000 | Superior Terminal Elevator Co.: | |
| Globe Elevator Co. P. V. Duluth Terminal [a] | 4,000,000 | Elevator K | 650,000 |
| | | Elevator L | 1,600,000 |
| | | Elevator M | 450,000 |
| | | Elevator N | 1,600,000 |

[a] Public elevator.

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Only one of the regular steamship lines operating to this port, namely, the United States & Dominion Transportation Co., owns its own wharf, the other lines using the railroad and other private wharves.

Four wharves for general freight are maintained by railroad companies. The Chicago & North Western Railway and the Northern Pacific Railway have general freight wharves at Duluth, and the Great Northern Railway and the Minneapolis, St. Paul & Sault Ste. Marie Railway, at Superior.

The only publicly-owned terminals at Duluth consist of four small wharves built at street ends, while the only public terminals at Superior consist of three open landing piers.

**Type of wharf construction.**—The wharves are in general of pile-and-timber construction, those used for iron ore being high trestles extending a great distance into the fairway. Most of the ore docks are of pile-and-timber construction, but three of the more recent docks have been built of steel on concrete piers or piling.

**Port administration.**—The port is under the control of the municipal authorities of Duluth and Superior, who have separate jurisdiction over the sections of the harbor lying within the limits of their respective cities. The city of Duluth is governed by a commission and has no official charged with the management of port affairs except a harbor master, who performs the customary duties of that office.

The city of Superior is governed by a commission and has no port official except a harbor master, although recent legislation empowers the city to appoint a harbor board with large powers.

Both cities have power under their charters and under the laws of their respective States to acquire and operate municipal wharves, warehouses, and other terminal facilities, but this power has not been exercised to any large extent.

**Port charges.**—Dockage is free to all vessels, but wharfage at the rate of 40 cents per ton is charged on shipments consigned locally to or from Duluth and also on traffic destined to or coming from points beyond Duluth by lines of railroads not having their own docks. These wharfage charges are, however, absorbed by the boat lines.[a]

## ERIE, PA.

The city of Erie has one of the few natural harbors on the Great Lakes and has the distinction also of being one of the few cities on the Lakes that have a public wharf.

Erie is on the south shore of Lake Erie on Presque Isle Bay, 148 miles north of Pittsburgh, 88 miles west of Buffalo, and 95 miles east of Cleveland.

Presque Isle Bay has a length from east to west of about 4½ miles and from north to south of from 1 to 1½ miles. The harbor basin is 2 miles long, one-half to 1⅓ miles wide, and 18 to 24 feet deep.

**Railroads.**—The city of Erie is served by the Bessemer & Lake Erie, the New York Central, the New York, Chicago & St. Louis, and two lines of the Pennsylvania Railroad.

[a] Special Report of the Chief of Engineers, U. S. Army, on Water Terminal and Transfer Facilities (H. Doc. No. 226, 63d Cong. 1st sess.), p. 1009.

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**Steamship lines.**—The Anchor Line of steamers, owned by the Pennsylvania Railroad, and the Cleveland & Buffalo Transit Co. are the only lines calling regularly at this port. The Anchor Line operates between Buffalo and Duluth, while the Cleveland & Buffalo Transit Co. operates between Cleveland and Buffalo.

**Commerce of the port.**—In the calendar year 1914 the water-borne commerce of the port of Erie amounted to 3,014,344 short tons, valued at $67,508,612. In the year 1913, which was a more nearly normal trade year and is, therefore, preferable for purposes of discussion, it amounted to 3,340,071 short tons, valued at $78,576,009. The receipts were 1,838,192 tons and the shipments, 1,501,879 tons.[b]

From the standpoint of tonnage, coal and iron ore were the principal items. The shipments of coal consisted of 1,028,408 tons of bituminous and 280,057 tons of anthracite. The receipts of iron ore amounted to 799,570 short tons.

**Extent and ownership of water front.**—Approximately 3 miles of the harbor front are available for economical development at the present time, and about 2 miles have been developed to a greater or less degree. Most of the water front is privately owned. The city of Erie owns only the street ends, the waterworks property, and some undeveloped land and water lots at the east end of the harbor.

**Terminals.**—The principal terminals on the Erie water front are those of the Pennsylvania Railroad. Of the four railroads entering the city, this is the only one that has water-terminal property there. The Pennsylvania terminals occupy an extensive shore frontage.

These terminals are located at the extreme eastern and western ends of the developed water front and are improved by long, solid-filled piers. The easterly group of terminals is used by the Anchor Line boats of the Pennsylvania Railroad and consists of four piers, as follows:

Ore dock, which is used principally for coal although equipped with ore-handling machinery. This dock has one Hulett electric unloading machine using 10-ton automatic buckets and two McMyler steam unloaders using 2-ton automatic buckets. Six hundred tons of ore can be unloaded per hour at this dock, and there is space for storing 160,000 tons.

Pulp wood and coal dock, which is used on one side for unloading pulp wood and on the other for loading anthracite coal into vessels. The coal side of the dock is equipped with one mechanical car dumper.

Flour dock, which is provided with warehouses on either side and is used largely for receipts of flour.

A merchandise pier, which has a warehouse on the slip side and two grain elevators. The elevators have a capacity of 1,000,000 bushels.

The westerly group of terminals of the Pennsylvania Railroad consists of three piers, from 1,000 to 1,100 feet in length, two being used as ore docks and one as a soft-coal dock. Each of the ore docks is equipped with 12 Brown "fast-plant," steam-power unloading machines using 2-ton automatic buckets and handling 6,000 tons of ore per hour.

The volume of iron ore handled at Erie has on the whole declined in recent years, the ports farther west being better situated for this traffic. It is interesting to note that the first shipment of ore in any quantity on the Great Lakes, which consisted of 152 tons sent from a mine in the Upper Peninsula of Michigan to a steel mill in Sharon,

[b] Report, Chief of Engineers, U. S. Army, 1914, p. 3101; idem, 1915, p. 3291.

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Pa., in September, 1853, was delivered at Erie and sent by canal to Sharon.

The public dock consists of a concrete pier 1,300 feet long. Breakwaters, which were erected for the protection of the canal boats operated on the canal between Erie and Sharon, extend at right angles to this pier, forming small basins or artificial harbors. An extension to this pier was constructed in 1909 by the State of Pennsylvania at a cost of $150,000. This extension is 550 feet long and 100 feet wide. The public dock is centrally located with respect to the main business of the city. The western side of this dock is used almost continuously for commercial purposes. The eastern side is used chiefly by pleasure boats.

Several other wharves, all of pier construction, are located in the Erie water front, one being used by a paper mill for receiving pulp wood and coal while the others are used by coal companies.

**Type of wharf construction.**—Practically all of the wharves consist of solid piers with timber bulkheads. The public dock, however, has a concrete superstructure.

**Port administration.**—The port is under the control of the municipal authorities. The administrative authority is nominally vested in the superintendent of the department of parks and public property but the active executive work is performed by a harbor master, who is appointed by the city council and devotes his entire time to harbor affairs.

**Port charges.**—The only item of interest in connection with this subject is the schedule of charges for wharfage at the municipal dock which is as follows:

| | | |
|---|---|---|
| Coal | per ton | $0.25 |
| Flour | per barrel | .05 |
| Lumber | per 1,000 feet | .25 |
| Marble | per ton | .25 |
| Merchandise | per barrel | .05 |
| Pig iron | per ton | .30 |
| Provisions | per barrel | .05 |
| Salt | do | .05 |
| Stone, cut | per ton | .25 |
| Shingles | per 1,000 | .05 |
| Staves and headings | do | .15 |
| Wood | per cord | .10 |

Wharfage on articles not shown in the above table are in proportion to the foregoing rates.

## ESCANABA, MICH.

Escanaba is one of the most important shipping ports for iron ore on the Great Lakes. In recent years the shipments of iron ore from Escanaba have been exceeded only by those from Duluth-Superior and Two Harbors. It is the only outlet for the iron-ore mines on the Menominee Range and a partial outlet for those on the Marquette Range.

Escanada is located on Little Bay de Noc, at the extreme northerly end of Green Bay, Lake Michigan, near the mouth of the Escanaba River and about 73 miles southeast of Marquette, Mich. It has, according to the Lake Survey Bulletin, a good natural harbor.[a] The harbor has been developed entirely at private expense.

[a] Lake Survey Bulletin No. 24, 1915, p. 136.

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**Railroads.**—The city is served by the Chicago & North Western Railway, the Chicago, Milwaukee & St. Paul, and the Minneapolis, St. Paul & Sault Ste. Marie Railway (the "Soo Line") in addition to the Escanaba & Lake Superior Railroad. The last-named line is primarily a logging railroad but is used also by the Chicago, Milwaukee & St. Paul in entering Escanaba.

**Steamship lines.**—The only regular lines of steamships that call at Escanaba are the Goodrich Transit Co., which maintains a schedule of one boat per week in each direction between Chicago and northern Michigan ports, including Escanaba, and the Wagonner & Roulett Steamship Line, which maintains a schedule of three boats weekly between Green Bay, Wis., and Escanaba and Gladstone, Mich.

**Commerce of the port.**—Since the port has been developed entirely by private parties, the United States Army engineer in charge of the district in which Escanaba is located makes no report on its commerce. The only data available show that in the calendar year 1913 the shipments of iron ore from Escanaba amounted to 6,768,582 short tons. It is probable that a large quantity of coal was also received at this port in that year since there are two fairly large coal docks on the water front.

**Extent and ownership of water front.**—About 6 miles of water front are available in Escanaba Harbor, practically all of which is owned by the Chicago, Milwaukee & St. Paul and the Chicago & North Western Railroads, and the Riparian Land Co.

**Terminals.**—The principal terminals are the ore docks or trestles used by the railroads for transferring ore from cars to vessels. The following is a list of these ore docks with the dimensions and capacity of each:

| Owners and numbers of ore docks. | Length. | Width. | Height. | Number of pockets. | Storage capacity. | |
|---|---|---|---|---|---|---|
| | | | | | One pocket. | Dock. |
| Chicago & North Western Ry.: | *Feet.* | *Feet.* | *Feet.* | | *Tons.* | *Tons.* |
| Dock No. 3 | 1,356 | 37 | 52 | 226 | 125 | 28,250 |
| Dock No. 4 | 1,500 | 37 | 59 | 250 | 125 | 31,250 |
| Dock No. 5 | 2,200 | 50 | 70 | 370 | 250 | 92,500 |
| Dock No. 6 | 1,920 | 50 | 70 | 320 | 250 | 80,000 |
| Chicago, Milwaukee & St. Paul Ry.: | | | | | | |
| Dock No. 1 | 1,500 | 52 | 66 | 240 | 175 | 42,000 |
| Dock No. 2 | 1,500 | 54 | 69 | 240 | 200 | 48,000 |

Two coal docks are located on the water front and are equipped for handling coal from vessel to dock or car. Practically all of the coal is bituminous and much of it is used for fuel at the ore mines and for domestic purposes.

One coal dock, that used by the Central Coal Co., is owned by the Chicago, Milwaukee & St. Paul Railway Co., while the other, which is occupied by the C. Reiss Coal Co., is owned by the Chicago & North Western Railway Co. The former dock is equipped with three 2-ton automatic buckets and can handle 250 tons per hour.

**Type of wharf construction.**—The terminals consist chiefly of long timber trestles for unloading iron ore.

**Port administration.**—No public control is exercised over port affairs, there being not so much as a harbor master.

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**Port charges.**—The subject of port charges at a port like Escanaba is of small general importance.

## FAIRPORT, OHIO.

Fairport is situated on Lake Erie at the mouth of Grand River, about 34 miles east of Cleveland. This port ranks seventh among the lower lake ports in volume of iron ore received.

Grand River is navigable for the largest lake vessels to the warehouse and elevator of the Baltimore & Ohio Railroad at Richmond, about 1 mile above the lake, and beyond this point for 1¼ miles for small vessels drawing 8 feet or less.[a] The companies using the docks keep a dredge in the river and maintain a channel 150 feet wide and 20 feet deep.

**Railroads.**—Fairport is served by the Baltimore & Ohio Railroad.

**Steamship lines.**—The freight vessels operated between Buffalo and Chicago by the Mutual Transit Co. call at this port but there are no passenger steamers. Practically all the vessels that enter Fairport Harbor are the bulk freighters that bring iron ore and take soft coal. During the season of navigation, which averages about eight months in the year, the harbor is quite busy. For example, during the 1913 season 626 vessels, 493 loaded and 133 light, with a total register tonnage of 1,877,526, entered this port. The majority of the vessels were of the second class, that is, of from 3,000 to 5,000 net tons.[b]

**Commerce of the port.**—According to statistics compiled by the United States Army Engineers,[b] the water-borne commerce at Fairport amounted to 3,156,842 short tons, valued at $21,277,106, in the calendar year 1913, and 2,454,304 short tons, valued at $12,816,270, in 1914. The principal commodities were as follows:

| Commodities. | Short tons. | | Value. | |
|---|---|---|---|---|
| | 1913 | 1914 | 1913 | 1914 |
| Receipts: | | | | |
| Iron ore | 2,281,581 | 1,745,110 | $7,944,791 | 5,095,098 |
| Wheat | 179,746 | 7,014 | 5,991,534 | 7,014 |
| Flux limestone | 103,812 | 183,186 | 83,050 | 146,548 |
| Fish | 1,940 | 1,826 | 165,572 | 110,340 |
| All other | 101,260 | 85,618 | 3,179,545 | 2,568,540 |
| Total | 2,668,339 | 2,022,754 | 17,364,492 | 7,927,540 |
| Shipments: | | | | |
| Coal— | | | | |
| Cargo | 425,074 | 406,800 | 850,144 | 1,078,020 |
| Bunker | 53,668 | 12,155 | 134,170 | 32,210 |
| All other | 9,761 | 12,595 | 2,928,300 | 3,778,500 |
| Total | 488,503 | 431,550 | 3,912,614 | 4,888,730 |

**Extent and ownership of water front.**—The principal water terminals are in the inner harbor and are located on the east bank of the river, which is completely occupied by private docks for nearly a mile above the lake.

[a] Lake Survey Bulletin No. 24 (April, 1915), p. 364.
[b] Report, Chief of Engineers, U. S. Army, 1914, p. 3083-3084; idem, 1915, p. 3282.

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The principal owner of river-front property is the Pennsylvania & Lake Erie Dock Co., a subsidiary of the United States Steel Corporation, which owns 4,950 feet front, including 390 feet on a slip. Another important tract of river-front property is that occupied by the Pittsburgh Coal Co. under a 97-year lease from the Pittsburgh & Fairport Terminal Co.

The Baltimore & Ohio Railroad Co. leases to the Fairport Warehouse & Elevator Co., a subsidiary corporation, a tract with 1,775 feet frontage on the west side of Grand River, about 1 mile south of the channel entrance.

**Terminals.**—The principal terminal is that of the Pennsylvania & Lake Erie Dock Co. Of the 4,950 feet of water front owned by this company, 2,730 feet have been improved by a wharf of modern concrete construction and the remainder by a pile-and-timber wharf, which is now practically unserviceable. This terminal handles all of the iron ore received at this port. The quantity handled varies considerably. In 1907, 2,730,161 short tons were received and in 1911 only 746,329 short tons.

This terminal is equipped with six Brown electric unloading machines using 5-ton automatic buckets and having a combined unloading capacity of 2,000 tons per hour, and six McMyler whirlies using 1-ton buckets and having an unloading capacity of 300 tons per hour. Tracks of the Baltimore & Ohio Railroad serve this terminal directly. The railroad yards in the rear of this terminal have a storage capacity of 700 cars.

The Pittsburgh Coal Co. terminal adjoins that of the Pennsylvania & Lake Erie Dock Co. and is improved by a slip which provides 900 feet of frontage. The bulkhead is of pile-and-timber construction. This terminal is used exclusively for the transfer of soft coal from freight car to lake vessel and is equipped with one car dumper (McMyler type). Tracks of the Baltimore & Ohio Railroad Co. serve this terminal.

The Baltimore & Ohio Railroad terminal consists of a wharf parallel to the river and a slip which has a frontage of 415 feet. The wharf is of pile-and-timber construction. This terminal is provided with a large freight warehouse and a grain elevator having a capacity of 1,000,000 bushels.

Five other wharves, one having 100 feet frontage and the others 66 feet each, are used by fish companies; they have only 9 to 11 feet of water alongside.

**Port administration.**—At a city as small as Fairport the matter of port government is of practically no importance. The port runs itself. The town council has, however, passed a number of regulations which provide in customary terms for the free and unobstructed navigation of the river.

**Port charges.**—The subject of port charges also is of no general importance, since the town is small and the water terminals are used almost entirely by companies handling bulk freight, such as iron ore, coal, grain, and limestone on through bills of lading.

## GRAND HAVEN, MICH.

Grand Haven, like Ludington and Manitowoc, is predominantly a car-ferry port, being the western terminus of the Detroit, Grand Haven & Milwaukee branch of the Grand Trunk Railroad system.

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The harbor is at the mouth of the Grand River, which is the largest river in Michigan and is navigable from Grand Haven to Grand Rapids, a distance of 39 miles. At the close of 1914 the available depths were 22 feet on the entrance bar and between the entrance piers, and 20 feet in the river to the car-ferry slip.[a]

**Railroads.**—Grand Haven is served by the Grand Trunk Railway and the Pere Marquette Railroad. This harbor is the western terminus of the Detroit, Grand Haven & Milwaukee branch of the Grand Trunk system, which operates two large car ferries between Grand Haven and Milwaukee during the entire year.

**Steamship lines.**—The Crosby Transportation Co. operates a regular line of freight and passenger steamers during the entire year between Grand Haven and Milwaukee in connection with the Grand Trunk Railway and, during the season of navigation, between Grand Haven and Muskegon.

The Goodrich Transit Co. operates a regular line of steamers between Chicago, Grand Haven, and Muskegon during the navigation season, with several trips daily in each direction.

**Commerce of the port.**—The water-borne commerce at Grand Haven in the calendar year 1914 amounted to 645,804 short tons, valued at $49,331,673. In the year 1913, which was a more nearly normal trade year and is, therefore, preferable for purposes of discussion, it amounted to 649,130 short tons, valued at $52,791,865. The receipts were 383,126 tons, and shipments 266,004 tons.

The principal receipts were grain, flour, etc., valued at $10,018,187; miscellaneous merchandise, at $8,209,250; hides and leather, at $2,428,800; copper, at $1,617,448; and beers, wines, and liquors, at $1,599,800. The principal shipments were miscellaneous merchandise, valued at $9,495,250; automobiles, at $4,199,950; and household goods and furniture, at $3,848,400. A large variety of articles make up the traffic of the port, about 97 per cent of which is through traffic.[b]

**Extent and ownership of water front.**—The improved section of the harbor consists of about 2,000 feet frontage on the left bank of the river, the right bank being unimproved and unprotected.

The principal portion of the developed frontage is occupied by the freight warehouses, grain elevator, and car-ferry transfer slip of the Grand Trunk Railway Co. which owns a continuous stretch of about one-quarter of a mile. The Pere Marquette Railroad also owns considerable water-front property. The Pennsylvania Railroad Co. owned 1,600 feet frontage on a basin back of the inner portion of the south entrance pier. The United States has acquired 900 feet of this frontage by condemnation, in addition to 600 feet of frontage by purchase from the Pere Marquette Railroad. The Federal Government has thus secured the ownership of all the land, except a street end, bordering the basin, which is used for storage and repair purposes for the Government property in this district.

**Terminals.**—The terminals of the Grand Trunk Railway are used by the two large car ferries operated by the railroad company and by the chartered freight and passenger steamers of the Crosby Trans-

[a] Lake Survey Bulletin No. 24 (April, 1915), p. 226.
[b] Report, Chief of Engineers, U. S. Army, 1914, p. 2962; idem, 1915, p. 3186.

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portation Co., which carry freight for the railroad on a tonnage basis to and from Milwaukee.

The Pere Marquette Railroad has no terminal at Grand Haven, although a sidetrack of this railroad is to be found on Robbins Wharf, which has also a sidetrack from the Grand Rapids, Grand Haven & Muskegon Electric Railway. This wharf is 275 feet long and is used under lease by the boats of the Goodrich Transit Co.

A certain portion of the water front is improved by revetments of a temporary character and is used as berths for fishing tugs and for a coal-storage wharf.

The only public terminals available are those at street ends, the best one being at the foot of Washington Street. For the use of this wharf the city charges each boat $100 per year.

**Type of wharf construction.**—The wharves are of pile and timber construction.

**Port administration and port charges.**—These subjects, so far as they relate to Grand Haven, are of little general importance, since the town is small and the commerce consists almost entirely of through traffic.

## HURON, OHIO.

Huron is located on the south shore of Lake Erie about 48 miles west of Cleveland and 9 miles east of Sandusky. It is known chiefly as a soft-coal shipping and iron-ore receiving port.

The harbor comprises the lower portion of the Huron River and two slips constructed by the Wheeling & Lake Erie Railroad Co. near the lake on the east side of the river. The depth of water in the entrance channel, in the river channel for more than a mile above the lake, and in the slips is 21 feet. The river is navigable for small-draft vessels as far as Milan, 8 miles above Huron.[a]

**Railroads.**—Huron is the Lake Erie terminus of the Wheeling & Lake Erie Railroad, and owes its importance as a harbor to this fact. The town is served also by the Lake Shore & Michigan Southern division of the New York Central Lines.

**Steamship lines.**—Like most of the smaller ports on the Great Lakes, Huron is served by no regular line of steamships, the only vessels calling at this port being bulk freighters.

**Commerce of the port.**—The entire commerce of this port is made up of soft coal, iron ore, and fish. In the calendar year 1914 the water-borne traffic amounted to 1,407,355 short tons, valued at $3,984,666. In the year 1913, which was a more nearly normal trade year and is, therefore, preferable for purposes of discussion, it amounted to 2,557,932 short tons, valued at $6,534,610, and consisted of 1,787,019 tons of coal, 769,983 tons of iron ore, and 930 tons of fish.[b]

**Extent and ownership of water front.**—About 2 miles of water front are available at Huron for large lake vessels. This frontage includes that of the two slips constructed by the Wheeling & Lake Erie Railroad.

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[a] Lake Survey Bulletin No. 24 (April, 1915) p. 382.
[b] Report, Chief of Engineers, U. S. Army, 1914, p. 3067; idem, 1915, p. 3274.

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**Terminals.**—Practically the only water terminals at Huron are those of the Wheeling & Lake Erie Railroad Co. The wharf frontage of this company has been increased to a total length of 5,620 feet by the construction of two slips. The slips are, respectively, 860 feet and 1,450 feet in length and 135 feet and 150 feet in width, and have a depth of 21 feet.

These terminals are used chiefly for the transfer of soft coal from car to vessel and of iron ore from vessel to car. The coal dock is equipped with two car-dumping machines (McMyler type), that have a combined handling capacity of 1,600 tons per hour. The iron-ore dock has an unloading capacity of 1,000 tons per hour and a storage capacity of 500,000 tons, and is provided with the following equipment: Four Hulett steam unloading machines, using 5-ton clam automatic buckets and having a handling capacity of 800 tons per hour, and two Hulett steam and hydraulic unloading machines, using 15-ton automatic buckets.

Three other wharves, two used by fish companies and one idle, are also to be found at Huron, but they are small and unimportant.

**Type of wharf construction.**—The only important terminal at Huron, that of the Wheeling & Lake Erie Railroad Co., is located on two long slips, the bulkheading consisting of timber and sheet piling.

**Port administration.**—As might be expected in the case of a small town with only one important water terminal, there is no authority charged with port administration. The only rules and regulations governing the navigation and use of Huron Harbor are those contained in section 4 of the river and harbor act of August 18, 1894, as amended June 13, 1902, which have to do with the mooring and the speed of vessels in the harbor.

**Port charges.**—The subject of port charges at Huron is of no general importance.

## LORAIN, OHIO.

Lorain Harbor is situated on Lake Erie at the mouth of Black River, about 30 miles west of Cleveland. The city of Lorain has grown rapidly in recent years and has large steel-rail and steel-tube manufacturing plants, as well as an extensive shipbuilding establishment.

The harbor comprises an artificial outer section of about 50 acres, created by the construction of breakwaters, and an inner section, consisting of the lower part of Black River. A channel 21 feet deep extends to a turning basin about 3 miles up the river, the larger portion being maintained by the city of Lorain and by private interests. The upper channel is quite crooked, and large vessels usually require the services of tugs.[a] To January 1, 1915, the city of Lorain had spent $479,093.27 in widening, dredging, and maintaining the channel in Black River, and $50,000 in the construction of a municipal dock.

**Railroads.**—Lorain is served by the Baltimore & Ohio Railroad (Cleveland, Lorain & Wheeling division), the New York, Chicago & St. Louis Railroad, the Lake Erie & Pittsburgh Railway, and the Wheeling & Lake Erie Railroad. In addition, there are the Lorain,

[a] Lake Survey Bulletin No. 24 (April, 1915), pp. 377–378.

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Ashland & Southern Railroad, a short local line, and the Lake Terminal Railway, controlled by the National Tube Co. of the United States Steel Corporation. The latter railroad has about 10 miles of main track and 52.34 miles of sidings in Lorain, and serves not only the several plants of the National Tube Co., but also four other industries and numerous shippers as well, since it connects with all of the above-named railroads.

**Steamship lines.**—No regular lines of steamboats enter this port, the only vessels being bulk freighters. The harbor is a busy one, however, as is indicated in the fact that during the 1913 season of navigation (Apr. 22 to Dec. 31) 1,447 vessels, 503 loaded and 944 light, with a total net register tonnage of 4,238,826, entered Lorain Harbor, and 1,437 vessels, 710 loaded and 727 light, with a total net register tonnage of 4,188,040, left the harbor.[a]

**Commerce of the port.**—Lorain ranks fifth among the ore-receiving ports and fourth among the coal-shipping ports on the Great Lakes. In the calendar year 1914 the commerce of Lorain Harbor consisted of 4,507,075 short tons, valued at $11,517,228. In the year 1913, which was a more nearly normal trade year and is, therefore, preferable for purpose of discussion, it amounted to 8,609,897 short tons, valued at $23,327,877. The receipts, including 4,157,503 tons of iron ore, amounted to 4,211,993 tons and the shipments, including 4,192,945 tons of cargo coal and 202,433 tons of bunker coal, to 4,397,904 tons.[b]

**Extent and ownership of water front.**—The present available water front at Lorain has a length of 6.3 miles, of which about 9 per cent is owned by the city and 91 per cent is held by private owners.

**Terminals.**—The city of Lorain owns at present one wharf, which has 433 feet frontage.

The principal private wharves are those owned by the Baltimore & Ohio Railroad, which has three terminals with an aggregate frontage of 2,845 feet. One is used as an ore dock and two as coal docks.

The ore dock is located at the entrance to the river and has a frontage of 845 feet. It is operated by the railroad company and is equipped with three Brown electric unloading machines using 9-ton automatic buckets and handling 1,000 tons of ore per hour. This dock has space for storing 360,000 tons of ore.

One of the coal docks owned by the railroad adjoins the ore dock and has a frontage of 1,300 feet. It is equipped with one car dumper (McMyler type), which has a capacity for handling 500 tons of soft coal per hour. The other coal dock operated by the railroad is located about 8,000 feet from the lake and has a frontage of 700 feet. This is the more active coal dock and is equipped with one car dumper (McMyler type) handling 1,000 tons of coal per hour.

The most important ore dock at Lorain is that of the National Tube Co., which is on Black River, about 2½ miles south of the entrance to the inner harbor. This dock has a frontage of 2,500 feet, 2,000 feet being in good condition and the remainder in fair condition. This dock has a storage capacity of 1,900,000 tons and is equipped with four Hulett automatic unloading machines, electrically operated, using 8-ton automatic buckets and having a handling capacity of 1,600 tons

[a] Report, Chief of Engineers, U. S. Army, 1914, pp. 3072-3073.
[b] Idem, 1914, p. 3073; idem, 1915, p. 3277.

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of ore per hour. In a recent year (1912) 2,623,545 tons of ore were unloaded at this dock.

Another important terminal is that of the American Shipbuilding Co., which occupies 2,607 feet of river frontage. Only a small quantity of freight is handled over this wharf, but there are two large dry docks used in connection with the plant, one being 500 feet long on blocks and 60 feet wide at the gates and the other 732 feet long and 80 feet wide. Many of the largest vessels on the Great Lakes have been built at this plant.

Two wharves are used by fish companies. These are situated nearly 1 mile from the lake and have a combined frontage of 540 feet. A lumber wharf about 1 mile from the lake has a frontage of 300 feet and another about 2 miles from the lake has a frontage of 225 feet. The latter, which belongs to the National Tube Co., is leased to a lumber company.

All of the above-mentioned wharves, except those owned by the city and the American Shipbuilding Co., are located on the west bank of Black River. The eastern bank of the river, which is largely held by corporations, has a large frontage available for terminal development.

**Type of wharf construction.**—About one-half of the improved frontage has wharves of pile and timber construction, the remainder having timber crib wharves.

**Port administration and port charges.**—These subjects are of little significance for ports such as Lorain, where the commerce consists almost entirely of iron ore and coal. It might be said, however, that the work of improving and maintaining the channel is under supervision of the director of public service, a city official, while the enforcement of harbor regulation is in the hands of a city harbor master.

## LUDINGTON, MICH.

Ludington is located on the eastern shore of Lake Michigan and owes its importance as a port chiefly to the fact that it is a transfer terminal of the Pere Marquette Railroad Co., which operates car-ferries to Milwaukee, Manitowoc, and Kewaunee, Wis.

The harbor is formed by Pere Marquette Lake, the north end of which is connected with Lake Michigan by a revetted channel about 2,000 feet long. Pere Marquette Lake is about 2 miles long, has an average width of one-half mile, and is 20 to 40 feet deep. The anchorage is good. The wharves are located along the easterly side of the lake.[a]

**Railroads.**—The principal railroad at Ludington is the Pere Marquette. A small railroad, the Ludington & Northern Railway, operates a belt line for freight service around the city. A new railroad, the Grand Rapids & Northwestern, is now under construction, and when completed will extend from Grand Rapids to Ludington. It is stated that this company owns a large area of water-front property at Ludington and will operate three car-ferries between Ludington and Milwaukee and Manitowoc, transferring freight between the Chicago, Milwaukee & St. Paul, the Chicago & North Western, and the Soo Line Railroads on the west shore of the Lake, and the Grand

[a] Lake Survey Bulletin No. 24 (April, 1915), pp. 232-233.



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Trunk, the Lake Shore & Michigan Southern, the Michigan Central, and Pennsylvania Railroads at Grand Rapids.[a]

**Steamship lines.**—In addition to the car ferries operating during the entire year between Ludington on the Michigan side and Manitowoc, and Kewaunee on the Wisconsin side, the Pere Marquette Railroad operates during the entire year a daily translake service of freight and passenger steamers between Ludington and Milwaukee and, from April 15 to December 1, a daily coastwise service between Ludington and Manistee, Mich., and a twice-daily coastwise service between Ludington and Pentwater, Mich. Boats of this line also operate to Portage Lake, Arcadia, and Frankfort, Mich.

The steamers of the Northern Michigan Transportation Co., which operate regularly between Chicago and northern Michigan points, make four calls weekly in each direction at Ludington.

**Commerce of the port.**—The water-borne commerce at Ludington consisted of 1,686,864 short tons of freight, valued at $61,282,751, in the calendar year 1913 and 1,510,437 short tons, valued at $53,408,710, in 1914. The following is a summary of the commerce of the port for the calendar years 1913 and 1914, as compiled by the United States Army Engineers:[b]

| Commodities. | Short tons. | | Value. | |
|---|---|---|---|---|
| | 1913 | 1914 | 1913 | 1914 |
| **Receipts:** | | | | |
| Grain and grain products | 363,935 | 456,832 | $10,959,740 | $14,343,117 |
| Lumber, logs, etc | 209,947 | 187,606 | 2,488,118 | 2,213,753 |
| Miscellaneous merchandise | 102,764 | 84,611 | 12,238,150 | 8,200,450 |
| Coal | 33,321 | 39,419 | 88,185 | 85,189 |
| All other | 54,547 | 68,938 | 5,269,454 | 5,343,273 |
| Total | 764,514 | 837,406 | 31,043,647 | 30,185,782 |
| **Shipments:** | | | | |
| Miscellaneous merchandise | 141,793 | 132,882 | 17,568,350 | 13,887,100 |
| Iron and steel articles | 63,283 | 41,054 | 5,062,640 | 2,052,700 |
| Hides and leather | 9,325 | 5,351 | 3,730,000 | 2,140,400 |
| Coal | 407,542 | 188,168 | 1,181,872 | 752,672 |
| Fruit and vegetables | 18,222 | 23,523 | 1,093,320 | 1,411,380 |
| Lumber, etc | 51,744 | 35,195 | 604,919 | 419,007 |
| Salt | 126,582 | 130,443 | 340,076 | 337,689 |
| All other | 103,859 | 116,415 | 657,927 | 2,221,980 |
| Total | 922,350 | 673,031 | 30,239,104 | 23,222,928 |
| Grand total | 1,686,864 | 1,510,437 | 61,282,751 | 53,408,710 |

Unfortunately, the through traffic carried by car-ferries is not separately shown in any commercial statistics at hand, but it is probable that it forms the great bulk of the commerce of the port.

**Extent and ownership of water front.**—The water terminals begin at the northeast corner of the lake immediately in line with the entrance channel and extend along the east side of the lake for approximately 1 mile. The principal portion of the improved frontage is held by the Pere Marquette Railroad Co., while large portions are held also by the Northern Michigan Transportation Co. and the Grand Rapids & Northwestern Railroad Co.

[a] Poor's Manual of Railroads, 1915, pp. 690–691.
[b] Report, Chief of Engineers, U. S. Army, 1914, p. 2978; idem, 1915, p. 3197.

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**Terminals.**—The terminals of the Pere Marquette Railroad occupy about 2,000 feet of water front and include two car-ferry slips, a grain elevator of 150,000 bushels capacity, several large warehouses, and the general terminal yards of the railroads. These terminals are used chiefly for the car-ferry business of the railroad and also by the Pere Marquette Line steamers engaged in a general freight and passenger business on Lake Michigan.

The Northern Michigan Transportation Co. owns a wharf which is used not only by the boats of this company but occasionally also by those of the Pere Marquette Line.

A long stretch of improved frontage is owned by the Grand Rapids & Northwestern Railroad Co. This frontage was formerly occupied by the wharves of lumber and salt companies, but the mills have burned and the wharves have been abandoned.

A number of wharves are actively used by salt and lumber companies, the most important being those of the Stearns Salt & Lumber Co. and the Northern Salt Co., both of which companies have special cargo boats for handling their traffic.

The city of Ludington owns and maintains one small wharf.

**Port administration and port charges.**—At this port, like many others of a similar character, there is no administrative authority charged with the supervision or control of harbor matters and the subject of port charges is of no importance.

## MANITOWOC, WIS.

Manitowoc owes its importance as a port chiefly to the car-ferry traffic maintained across Lake Michigan by the Pere Marquette and the Ann Arbor Railroad systems in connection with the Chicago & North Western Railway and the Soo Line Railroad. Practically two-thirds of the total commerce at Manitowoc is carried in car-ferries.

The city is located at the mouth of a small river, the Manitowoc, on the west shore of Lake Michigan, about 75 miles north of Milwaukee.[a]

**Railroads.**—Manitowoc is served directly by the Chicago & North Western Railway and the Minneapolis, St. Paul & Sault Ste. Marie Railway (Soo Line), and indirectly by the Pere Marquette Railway and the Ann Arbor Railroad, whose car-ferries from Frankfort to Ludington, Mich., respectively, connect with the above-named railroads at Manitowoc.

**Steamship lines.**—The vessels of the Goodrich Transit Co., the Erie Railroad Lake Line, and the Lehigh Valley Transportation Co. call at this port. The Goodrich Transit Co. operates a daily freight and passenger service running between Milwaukee, Manitowoc, and Chicago in summer and three or four boats weekly in each direction in winter. The vessels of the two other companies handle grain chiefly and operate according to the demands of that trade.

**Commerce of the port.**—The total commerce of this port in the calendar year 1914 was 1,742,860 short tons, valued at $106,412,333. In the year 1913, which was a more nearly normal trade year and is, therefore, preferable for purposes of discussion, it amounted to 1,901,065 short tons, valued at $72,805,380. The receipts were 1,141,159 tons and the shipments 759,906 tons. The car-ferries

[a] Lake Survey Bulletin No. 24 (April, 1915), pp. 189–190.

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handled all except 36,184 tons of the shipments and all except 504,624 tons of the receipts.[a]

The shipments by car ferry consisted largely of general merchandise, 280,892 tons, valued at $28,090,000; grain and flour, 208,160 tons, valued at $7,136,250; and lumber, 230,000 tons, valued at $2,633,000. The principal receipts by car ferry were general merchandise, 252,619 tons, valued at $25,260,000; manufactured iron, 36,111 tons, valued at $2,900,000; and coal, 320,495 tons, valued at $1,195,000.

The shipments otherwise than by car ferry were small and consisted largely of grain. The receipts otherwise than by car ferry were made up largely of soft coal (425,440 tons), hard coal (46,721 tons), and general merchandise (9,155 tons).

**Extent and ownership of water front.**—About 3 miles of water front are available at Manitowoc, but only about 8,800 feet have been improved with wharves. The city owns 520 feet of river frontage, not including street ends. Of this frontage 120 feet are leased to the Manitowoc Gas Co., while the balance is unused. Two railroad companies own 4,485 feet of improved frontage, the Soo Line holding 3,060 feet and the Chicago & North Western 1,425 feet. The Goodrich Transit Co. has 625 feet. The Manitowoc Shipbuilding & Dry Dock Co. owns 2,000 feet. Seven other parties, grain or coal dealers, own an aggregate of 1,720 feet.

In addition, 500 feet of street ends and 5,850 feet of private frontage have been bulkheaded but are not used as water terminals except for mooring, while 2,100 feet of unimproved frontage is unavailable because of high river banks.

**Terminals.**—The Chicago & North Western Railway Co. occupies only one of its three wharves, this being used by the car ferries of the Pere Marquette and the Ann Arbor railroads for the interchange of through freight and passenger traffic. The other two wharves are leased, one to the C. Reiss Coal Co. and the other to a company dealing in crushed stone.

The Minneapolis, St. Paul & Sault Ste. Marie Railway (Soo Line) has four wharves. One is used by the car ferries of the Pere Marquette and the Ann Arbor railroads for the interchange of through freight and passenger traffic. Another is used by the railroad in the interchange of freight traffic with the boats of the Erie Railroad Lake Line and the Lehigh Valley Transportation Co. Another dock is leased to the C. Reiss Coal Co. and is equipped with modern coal-handling facilities. The remaining dock is leased to the Western Elevator Co., which has a grain elevator of 600,000 bushels capacity at this point in addition to one of 1,750,000 bushels capacity at another dock that it owns.

The Goodrich Transit Co. owns two docks. One is used for receiving soft coal for the company's use, and the other for its freight and passenger boats.

The city maintains for its own use a street-end wharf 66 feet wide.

**Type of wharf construction.**—The wharves are of pile and timber construction and parallel the water front.

**Port administration.**—Harbor affairs are under the general supervision of the harbor committee of the city council. The council has

[a] Report, Chief of Engineers, U. S. Army, 1914, pp. 2897; idem, 1915, p. 3129.

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provided some regulations governing the use of the harbor which are enforced by a city harbor master.

**Port charges.**—The matter of port charges at Manitowoc has little significance, as the great bulk of the traffic consists of through traffic that is handled on through bills of lading.

## MARQUETTE, MICH.

The city of Marquette is located on Marquette Bay, on the south shore of Lake Superior, 158 miles west of Sault Ste. Marie and 258 miles east of Duluth. Marquette Bay is about 1½ miles long and one-half of a mile wide and has a natural depth of from 18 to 20 feet.[a] This harbor is unique among those on the Great Lakes in that practically no dredging has been required for its development.

The city of Marquette owes its importance to its proximity to the Marquette Iron Range in the northern peninsula of Michigan. This port was used in September, 1853, for the first large shipment of iron ore from an upper lake port to a port on the lower lakes.

**Railroads.**—Marquette is served by the Chicago & North Western, the Chicago, Milwaukee & St. Paul, the Duluth, South Shore & Atlantic, the Lake Superior & Ishpeming, and the Munising, Marquette & Southeastern railways. The Lake Superior & Ishpeming and the Munising, Marquette & Southeastern railways are under one control and are short ore-carrying lines.

**Steamship lines.**—The freight and passenger boats of the Anchor Line (Erie & Western Transportation Co.), which is owned by the Pennsylvania Railroad system, and the boats of the Chicago & Duluth Transportation Co. call at Marquette. The principal use of the port is for the shipping of iron ore and the receiving of coal, both of these commodities being carried in bulk freighters.

**Commerce of the port.**—According to the commercial statistics prepared by the United States Army Engineers, the water-borne commerce in the harbor of Marquette (including the harbor of refuge, Marquette Bay), in the calendar year 1914 amounted to 2,230,934 short tons, valued at $6,510,945. In the year 1913, which was a more nearly normal trade year and is, therefore, preferable for purposes of discussion, it amounted to 4,258,991 short tons, valued at $12,666,358. The receipts were 348,241 tons and the shipments 3,910,750 tons. The principal receipts were anthracite and bituminous coal, 18,050 and 319,720 tons, respectively. The entire volume of shipments except 11,377 tons consisted of iron ore.[b]

**Extent and ownership of water front.**—In the lower portion of the harbor there is approximately 7,500 linear feet of protected shore line and in the upper harbor about 4,000 feet. All of this frontage is privately owned except approximately 1,500 linear feet in the upper harbor fronting on Presque Isle, this frontage being owned by the city of Marquette. Only 2,300 linear feet, or about one-fifth of the entire available water front, is in actual use, 1,800 feet in the lower harbor and 500 feet in the upper harbor. Railroad companies are the principal owners of the water front and hold approximately one-half of the present available frontage. The active portion of the

[a] Lake Survey Bulletin No. 24 (April, 1915), pp. 44–45.
[b] Report, Chief of Engineers, U. S. Army, 1914, pp. 2870–2872; idem, 1915, pp. 3106–3108.

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water front in the lower harbor, which lies close to the main business district of the city, is owned by the Duluth, South Shore & Atlantic Railway and is occupied by its terminals. The upper harbor, which is also known as Presque Isle, or North Marquette, is 3 miles north of the lower harbor, but is within the city limits of Marquette. In this section of the harbor the Lake Superior & Ishpeming Railway owns about 1,300 feet of frontage, while the Duluth, South Shore & Atlantic Railway owns 2,600 feet of frontage, none of which is improved for water terminals.

**Terminals.**—The terminals of the Duluth, South Shore & Atlantic Railway are in the lower harbor. Three of these terminals are known as ore docks and two as coal docks. Two of the ore docks have been dismantled, but a portion of one has been converted into a freight and passenger dock, which is used by the boats of the Anchor Line.

The active ore dock is of modern construction. It is 1,236 feet in length, 51 feet in width, and 70 feet above the water. It has 200 pockets, each of which holds 225 tons. The coal docks owned by this railroad have been leased to private companies. Both docks are equipped with modern unloading machinery, one having a handling capacity of 200 tons per hour and a storage capacity of 35,000 tons, while the other has a handling capacity of from 100 to 150 tons per hour and a storage capacity of 15,000 tons.

In addition to the frontage occupied by the terminals of the Duluth, South Shore & Atlantic Railway, a considerable frontage which is owned privately is at present unoccupied but is suitable for terminal development. The city of Marquette maintains no public wharves.

The terminals in the upper harbor are owned by the Lake Superior & Ishpeming Railway Co. and operated by the United Dock Co. These docks are used only by the bulk-freight vessels of the Cleveland Cliffs Iron Co., which controls both the railroad and the docks. The terminals of the Lake Superior & Ishpeming Railway include two ore docks or trestles, each being 1,400 feet in length and having 200 pockets. The older dock is of timber construction and is 54 feet above the water, while the newer dock is of steel and concrete construction and is 75 feet high. The pockets of the older dock hold only 125 tons each; those of the newer dock hold 250 tons. The docks are of the usual trestle type, arranged and equipped for the rapid loading of ore vessels by gravity. There is also a merchandise wharf which is used chiefly for receiving soft coal for the use of the railroad and the mines of the Cleveland Cliffs Iron Co.

**Port administration.**—The only port official is the harbor master, who performs the usual duties of that office.

**Port charges.**—The subject of port charges at Marquette is one of little or no general significance.

## MILWAUKEE, WIS.

Milwaukee, which is one of the most active ports on the Great Lakes, is located on the west shore of Lake Michigan at the mouth of Milwaukee River, about 85 miles north of Chicago and 85 miles west of Grand Haven.

The port comprises an outer and an inner harbor, as indicated on the map opposite this page. The outer harbor, which is used chiefly for

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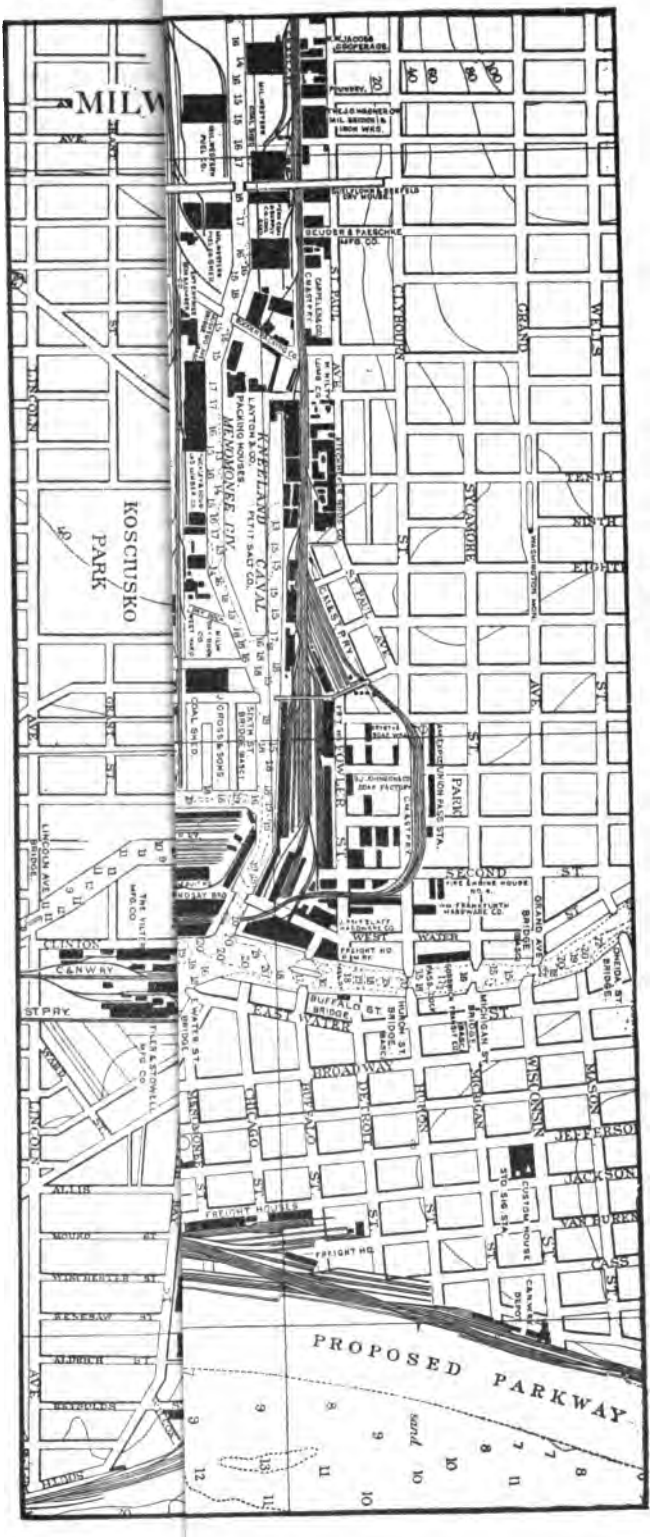


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refuge, has been formed by the construction of breakwaters. The inner harbor is made up of parts of three rivers and several canals. The Milwaukee River, flowing from the north, is joined about five-eighths of a mile north of the main entrance channel by the Menominee River, which enters from the west, while the Kinnikinnic, flowing from the south, merges with the other two rivers at the present channel entrance.[a]

The Milwaukee River is navigable for about 2¾ miles; the Menominee for about 2 miles; and the Kinnikinnic for about 2¼ miles. The channels in these rivers have been dredged and are maintained at a depth of 21 feet by the city of Milwaukee. The United States Lake Survey Office reports that "the channels are narrow, tortuous, and not provided with turning basins; several of the bridge openings are also too narrow and their navigation is quite difficult."[a]

Two turning basins as well as certain other improvements that will greatly improve the inner harbor have been provided for by the Federal Government upon the condition, not yet fully complied with, that the city of Milwaukee should donate the land required for the turning basin and for widening the Kinnikinnic and Menominee Rivers, should revet all channels and basins wherever necessary, and should maintain the improvement after its completion.

**Railroads.**—Milwaukee is served directly by the Chicago, Milwaukee & St. Paul, the Chicago & North Western, and the Minneapolis, St. Paul & Saulte Ste. Marie Railroads, and indirectly, by means of car ferries, by the Pere Marquette and the Grand Trunk Railroads.

**Steamship lines.**—The following is a list of the principal passenger and package-freight lines that call regularly at the port of Milwaukee:

| Lines. | Sailings. | Ports of call. |
|---|---|---|
| Crosby Transportation Co. | 1 daily | Milwaukee, Grand Haven, Muskegon. |
| Goodrich Transit Co. | do [a] | Chicago, Racine, Milwaukee. |
| Do. | 3 weekly [b] | Chicago, Milwaukee, Mackinac Island, and intermediate points. |
| Hill Steamboat Co. | 1 daily | Milwaukee, Kenosha, Waukegan. |
| Northern Michigan Transportation Co. | do [c] | Chicago, Racine, Milwaukee. |
| Do. | 1 weekly [d] | Chicago, Milwaukee, and Northern Michigan points. |
| Northern Steamship Co. | 1 weekly | Milwaukee, Chicago. |
| Pere Marquette Line. | 1 daily | Milwaukee, Ludington. |

[a] Also three daily from June 24 to Sept. 6.
[b] During July and August.
[c] Except Sunday.
[d] June 23 to Sept. 15.

A fairly frequent freight service is also maintained, during the navigation season, between Milwaukee and Ogdensburg, Oswego, Buffalo, Erie, Cleveland, Toledo, and other Lake Erie ports, by vessels of the Erie & Western Transportation Co. (Anchor Line), the Erie Railroad Lake Line, the Lehigh Valley Transportation Co., the Rutland Transit Co., and the Western Transit Co. The Rutland Transit Co. is owned by the Rutland Railroad Co. and the Western Transit Co. by the New York Central Railroad. The Erie Railroad and the Lehigh Valley Railroad own the lines bearing their respective names, while the Pennsylvania Railroad owns the Anchor Line.[b] In addition there is the Canada Atlantic Transit Co., which is owned by the Grand Trunk Railway and operates between Milwaukee and ports on Georgian Bay (Lake Huron).

[a] Lake Survey Bulletin No. 24 (April, 1915), p. 166.
[b] See, however, pp. 16 and 17.

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**Commerce of the port.**—Both in the volume and in the value of commerce, Milwaukee ranks high among the ports on the Great Lakes. The year 1913 is the most recent normal trade year and the statistics for this year are, therefore, preferable for purposes of discussion. In 1913 the water-borne commerce at Milwaukee amounted to 8,647,230 short tons, valued at $140,734,750.[a] The tonnage moved by car ferries (1,150,307 short tons) formed less than one-sixth of the total volume, but its value ($35,886,750) was more than one-fourth of the total value of the water movement in 1913.

The principal shipments and receipts in 1913 and 1914 by car ferry were as follows:[a]

| Commodities. | Short tons. | | Value. | |
|---|---|---|---|---|
| | 1913 | 1914 | 1913 | 1914 |
| Shipments: | | | | |
| Miscellaneous merchandise | 250,000 | 373,735 | $12,500,000 | $37,373,500 |
| Grain, malt, flour, etc | 146,546 | 204,571 | 4,451,000 | 7,301,215 |
| Copper | 6,156 | 2,127 | 1,465,000 | 65,937 |
| Lumber | 106,500 | 150,628 | 1,100,000 | 2,083,694 |
| Receipts: | | | | |
| Miscellaneous merchandise | 275,000 | 387,442 | 13,750,000 | 51,629,670 |
| Manufactured iron | 13,000 | 28,923 | 1,040,000 | 2,386,148 |
| Hard coal | 80,200 | 345 | 470,000 | 2,156 |
| Soft coal | 242,500 | 199,152 | 680,000 | 617,371 |

In the list of shipments in vessels other than car ferries, miscellaneous merchandise, largely the products of the varied industries of the city, was the principal item, the shipments in 1913 amounting to 444,566 short tons, valued at $22,000,000. The shipments of flour aggregated 230,736 short tons, valued at $11,150,000, while the shipments of mill feed amounted to 194,540 tons, valued at $4,500,000, and those of corn, oats, rye, and wheat to 146,368 tons, valued at $3,400,000.

In the list of commodities received otherwise than by car ferries, coal is the most important item from the standpoint of tonnage, approximately 80 per cent of the inbound cargoes consisting of hard and soft coal. The receipts of soft coal in 1913 totaled 4,107,030 tons and those of hard coal 1,114,400 tons. Receipts of miscellaneous merchandise, which was the most important item in value, amounted to 837,370 tons. Iron ore (239,454 tons) and salt (87,372 tons) were other items of importance in the inbound tonnage. The value of the receipts of miscellaneous merchandise was $41,750,000, of coal $18,000,000, and of manufactured iron, $2,040,000. These three items account for nearly all of the total value of receipts by vessels ($63,683,000).

**Extent and ownership of water front.**—Approximately 20 miles of water front, all within the inner harbor, are available for terminal development at Milwaukee. This includes frontage on slips and on various canals and basins, as well as on the navigable portions of the Milwaukee, Menominee, and Kinnikinnic Rivers. It has been estimated that about 81 per cent of the total available frontage is in actual use, 65 per cent by industries requiring water transportation and 16 per cent by mercantile and manufacturing concerns having no need of water frontage.

[a] Report, Chief of Engineers, U. S. Army, 1914, pp. 2904–2905; idem, 1915, p. 3129.

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The available water front is apportioned approximately as follows: [a]

| | Feet. |
|---|---|
| Milwaukee River: | |
| Upper or shipping zone | 14,523 |
| Mercantile zone | 6,685 |
| Harbor zone | 6,550 |
| Total | 27,758 |
| Menominee River and Kneeland Canal | 21,525 |
| South Menominee and Burnham Canals | 21,475 |
| Kinnikinnic Basin and River | 30,337 |
| Total | 101,095 |

The canals connected with the Menominee River add greatly to the length of the available water front of the port. The Kneeland Canal is an offshoot of that river and parallels the main stream for about 1,600 feet. It is a narrow channel, averaging only about 80 feet in width. The South Menominee and Burnham Canals parallel the Menominee River on the south for the greater part of its length. The South Menominee Canal, including the southern half of the Holton Canal, is about 1 mile in length and has four slips. It has an average width of 140 feet and a depth of about 20 feet. The Burnham Canal is a little over three-fifths of a mile long and has no slips. This canal is 130 feet wide and has a depth of 15 or 16 feet.[b]

While these channels are adjacent to a vast shipping district in the Menominee Valley, their usefulness is impaired to a considerable extent by the tortuous nature of the lower end of the South Menominee Canal, where it connects with the river. This prevents vessels of the largest class from reaching the docks situated there.

Excellent studies of the water front, terminal facilities, and commerce of the port of Milwaukee have been made by the Milwaukee Harbor Commission. One report made by the commission contains an excellent analysis of the uses of the river as well as of the character of ownership of the water front.

The following table compiled from the annual report of the commission, Section B, dated May, 1913,[b] shows the number of feet front that are employed for various classes of business on each of the main divisions of the harbor:

| Character of business | Milwaukee River. | | | Menominee River and Kneeland Canal. | South Menominee and Burnham Canals. | Kinnikinnic Basin and River. | Total |
|---|---|---|---|---|---|---|---|
| | Upper shipping zone. | Mercantile zone. | Harbor zone. | | | | |
| | *Feet.* | *Feet.* | *Feet* | *Feet.* | *Feet.* | *Feet.* | *Feet.* |
| Coal and wood | 4,035 | 150 | ..... | 10,575 | 4,100 | 7,125 | 25,985 |
| Lumber yards | 1,350 | ..... | ..... | 1,300 | 5,675 | 1,455 | 9,780 |
| Steamboat docks | ..... | 800 | 2,975 | 2,025 | 1,450 | 925 | 8,175 |
| Mercantile and manufacturing | 600 | 4,835 | 1,550 | ..... | ..... | ..... | 6,985 |
| Tanneries | 2,850 | ..... | ..... | ..... | 2,025 | 475 | 5,350 |
| Salt warehouse | ..... | ..... | ..... | 3,175 | 325 | 950 | 4,450 |
| Grain elevators | ..... | ..... | 650 | 750 | 1,550 | ..... | 2,950 |
| Stone, sand, and gravel | 500 | ..... | ..... | 900 | 925 | 425 | 2,750 |
| Shipyards | ..... | ..... | ..... | 425 | ..... | 1,700 | 2,125 |
| Dredging and dock | ..... | ..... | ..... | ..... | 1,675 | ..... | 1,675 |
| Iron-ore docks | ..... | ..... | ..... | ..... | ..... | 1,175 | 1,175 |
| Flour and feed | 875 | ..... | ..... | ..... | ..... | ..... | 875 |
| Post, tie, and pole | ..... | ..... | ..... | ..... | 500 | ..... | 500 |
| Miscellaneous | 2,113 | 150 | 1,125 | 2,075 | 1,425 | 2,482 | 9,370 |
| Vacant | 2,200 | 750 | 250 | 300 | 1,825 | 4,675 | 10,000 |
| Undeveloped | ..... | ..... | ..... | ..... | ..... | 8,950 | 8,950 |
| Total | 14,523 | 6,685 | 6,550 | 21,525 | 21,475 | 30,337 | 101,095 |

[a] Report, Milwaukee Harbor Commission, May, 1913, Sec. B, pp. 23–25. [b] Idem, pp. 17–22.

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Much of the best water front is owned by the Chicago, Milwaukee & St. Paul and the Chicago & North Western Railroads. These railroads, together with the Pere Marquette Railroad and the Milwaukee Electric Light & Railway Co., own 18,635 feet, their respective holdings being as follows:[a]

| | Feet. |
|---|---|
| Chicago, Milwaukee & St. Paul Ry | 13,405 |
| Chicago & North Western Ry | 3,525 |
| Pere Marquette R. R | 605 |
| Milwaukee Electric Light & Ry. Co | 1,100 |
| Total | 18,635 |

The Chicago, Milwaukee & St. Paul Railway is the largest single owner of Milwaukee dock property, according to the investigations made by the Milwaukee Harbor Commission.[a]

> Virtually all the desirable frontage in the Menominee Valley suitable for the warehouse transshipping trade, or 27 per cent of the entire river frontage in that zone harbor, is owned by this road. * * * Some of the railway's river property in Menominee Valley is under lease to parties engaged in the coal and salt trade and to others requiring yard room for handling coarse freight, such as lumber, wood, ties, etc. Three grain elevators, with a combined capacity of 2,400,000 bushels of grain, occupying sites on the Menominee River and South Menominee Canal, are also owned by the Chicago, Milwaukee & St. Paul Railway Co. In fact no other railroad has access to this immense manufacturing, grain, and coal-receiving district.

This railway company also owns the only piece of warehouse frontage in the upper shipping zone of the Milwaukee River, as well as the best warehouse property in the harbor zone of the Milwaukee River.[a] The holdings of the Chicago & North Western Railway Co. include 1,800 feet of elevator and warehouse frontage in the harbor zone of the Milwaukee River. "These are the only warehouses and elevators this company possesses in Milwaukee Harbor at the present time. The elevators have a combined capacity of 1,500,000 bushels of grain."[a]

The Chicago & North Western Railway Co. also owns considerable water frontage in the Kinnikinnic zone of the harbor, these holdings representing about 11 per cent of the entire frontage in that section. This company has recently developed 1,200 feet of frontage in this section and is now engaged in the construction of a grain elevator with a capacity of 1,250,000 bushels.

The Pere Marquette Railroad Co. owns 180 feet of warehouse property in the mercantile section of the Milwaukee River, this property being used as a wharf by the Pere Marquette Line steamers. This company also owns 425 feet frontage on the north bank of the Kinnikinnic River, this tract being used as a terminal for its car ferries operating between Milwaukee and Ludington, Mich.

The Milwaukee Electric Light & Railway Co. is the owner of 800 feet of dock property on the Milwaukee River and 300 feet on the Menominee River. The Milwaukee Gas Light Co. owns 2,270 feet of valuable dock property, the greater portion of which lies on the Menominee River and is leased to the Youghiogheny & Ohio Coal Co.

The only improved docks and warehouse frontage of importance that the railroad companies do not own or control are the docks of the Goodrich Transit Co., the docks of the Chicago, Racine & Milwaukee Line, and the warehouse property of the E. H. Abbott Estate.[a]

[a] Report, Milwaukee Harbor Commission, May, 1913, Sec. B, pp. 11-12.

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The city of Milwaukee owns no water front of commercial value, and consequently no terminals. The Milwaukee Harbor Commission, however, has recommended strongly that the city should acquire at an early date Jones Island in the Kinnikinnic Basin, "for the reason that it affords the only remaining opportunity for the municipality to acquire water frontage and thus safeguard its commercial future and also because of the fruitful field of harbor development which would thus be opened up." The engineering problems connected with this development would not be great. The property, which is owned by the Illinois Steel Co. and others, is now under process of condemnation by the city.

Although the city of Milwaukee owns no water front available for commercial purposes, it has nevertheless expended large sums for the development of the inner harbor. The total amount expended by the city up to and including the year 1912 was $1,535,932. Since that time the city has expended large sums for the acquirement of property necessary for turning basins and for the widening of several parts of the harbor.

**Terminals.**—Studies made by the Milwaukee Harbor Commission [a] show that in the upper shipping zone of the Milwaukee River "there are six coal-receiving plants, including one private dock, seven tanneries, one large lumber yard, three flour mills, and two sand and stone yards." In addition, there is a grain elevator with a capacity of 225,000 bushels of grain, which is provided with facilities for loading. The commission reports that 66.3 per cent of the river frontage in this zone is occupied by interests making use of water facilities to a greater or less extent, but that there is also considerable vacant frontage which may eventually be used for shipping.

In the mercantile zone of the Milwaukee River, it is reported,[a] the only lake-shipping activities are to be found at the warehouses and docks of the Goodrich Transit Co., the Pere Marquette Line steamers, and the Chicago, Racine & Milwaukee Line. These docks are situated in the extreme lower end of the zone in the midst of mercantile and manufacturing establishments, mercantile enterprises occupying 72.3 per cent of the dock frontage in this section of the river, while only 12 per cent is devoted to shipping. Lack of railway connection restricts its value for anything more extended in the line of freight traffic.

In the harbor zone of the Milwaukee River are found the terminals of the Crosby Transportation Co., the Grand Trunk Steamship Line, the Rutland Transit Co., the Canada Atlantic Transit Co., and of two harbor tug lines. In addition, there are also in this section grain elevators, which have a combined capacity of 1,500,000 bushels, and two freight warehouses. The elevators and one freight house belong to the Chicago & North Western Railway Co., the former being under lease to private parties. One freight warehouse, known as the Abbott warehouse, which is owned by the E. H. Abbott Estate and operated by the Milwaukee Property Co., is used for the general storage of package freight and has a capacity of 5,000 tons. The Milwaukee Harbor Commission reports that "this section of the river affords some admirable warehouse sites and is naturally fitted for the transaction of lake-shipping business, but, unfortunately, railway connection is lacking in

[a] Report, Milwaukee Harbor Commission, May, 1913, sec. B, p. 18.

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some cases and is inadequate in others and in consequence several fine pieces of river property are lying idle. This zone of the river is almost exclusively fitted to enterprises devoted to lake shipping."[a] One drawback to the Milwaukee River is to be found in the number of bridges spanning it. The river is bridged by eight bascule structures of modern type and six equal arm-swing bridges.

The industrial section of the Milwaukee Harbor is to be found in the Menominee Valley, which includes the Menominee River, the Kneeland Canal, and the South Menominee Valley, and here are found 4 steamship warehouses, 2 general storage warehouses, 3 grain elevators, 14 coal-receiving yards, 12 lumber yards, 1 wood, post, pile, and tie yard, 4 tanneries, 3 salt warehouses, 3 stone and sand yards, 2 cement and lime warehouses, 3 meat-packing plants, and a variety of minor manufacturing establishments.[a]

Transshipping facilities are more extensive in the Menominee Valley than in any other part of the harbor, because of the fact that the Chicago, Milwaukee & St. Paul Railway Co. owns a large area of property along the Menominee River and the South Menominee Canal. All of the steamship and transfer warehouses and grain elevators in this district, as well as the sites occupied by two large coal companies, are owned by the railway company.

The water front of the Menominee Valley is now being utilized to its limit, the amount of vacant dockage being less in this district than in any other section of the harbor. Because of the thorough utilization of river frontage in the Menominee River the condition of the docks here is possibly better on the whole than that of the docks on any other stream in the harbor with the exception of some sections of the mercantile zone of the Milwaukee River.[b]

The Menominee Valley is spanned by one railway swing bridge and four municipal bridges of the bascule type. The South Menominee Canal is crossed by only one bridge and the Burnham Canal by two bridges.

In the Kinnikinnic Basin are to be found several coal docks, 4 lumber yards, 3 wood yards, 2 iron-ore docks, 3 stone and gravel yards, 1 shipyard, 1 salt warehouse, 1 tannery, and 2 car-ferry slips. The car-ferry slips belong to the Grand Trunk and the Pere Marquette Railroads and are "conspicuous activities of this section of the harbor." In this section also is the dock of the Milwaukee Coke & Gas Co., which is said to be the largest individual coal-receiving plant in the world. The Kinnikinnic River is crossed by four municipal and three railroad bridges.[b]

**Type of wharf construction.**—Practically all of the wharves are of pile-and-timber construction. Upon recommendation of the Milwaukee Harbor Commission the common council has passed an ordinance which requires that all new docks and all old docks that are reconstructed shall have reinforced-concrete superstructures. In this connection the commission made the following statement:[b]

> The use of reinforced concrete in pier and dock construction is rapidly becoming universal, not only because of the strength and durability of concrete work, but also for the further reason that high-class timber is becoming scarce and more expensive, thus correspondingly decreasing the margin of cost in favor of wood construction which exists at present, and making it more economical in the long run to employ

[a] Report Milwaukee Harbor Commission, May, 1913, sec. B, pp. 19–20. [b] Idem, pp. 20–22.

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the more lasting material. Concrete superstructure will also retain its alignment better than timberwork and thus more effectively maintain the integrity of established channel limitations.

**Port administration.**—Harbor affairs at Milwaukee are under the supervision of the Milwaukee department of public works, at the head of which is the commissioner of public works, appointed by the mayor for a term of two years. The commissioner appoints all his subordinates. No distinct division in the department of public works is specially charged with harbor affairs, although there is a permanent secretary of the Milwaukee Harbor Commission, a harbor master, and an inspector of dredging. Apparently the supervision of harbor affairs is under the same control as the bridges of the city. This, probably, is a fortunate combination, since many of the bridges span the navigable portions of the harbor and their operation affects the use of the river for purposes of navigation.

The Milwaukee Harbor Commission assists the city council in a purely advisory way in the development of the harbor. This commission, which consists of nine members appointed by the council, has made valuable studies of the harbor conditions at Milwaukee and, in this as well as other ways, has assisted the city council in its work.

The financial statement accompanying the annual report of the department of public works for the calendar year 1913 shows the following expenditures for harbor and bridges exclusive of new construction and repairs:

| | |
|---|---|
| Docking and dredging | $66,189.74 |
| Harbor master | 1,125.53 |
| Harbor commission | 1,944.64 |
| Bridge administration | 13,509.90 |
| Bridge operation and maintenance | 97,872.52 |
| Total | 180,642.33 |

The authority of the city extends at present to the regulation by the city council of dock lines and the supervision of dock and warehouse construction. All river and harbor work, such as dredging, widening of channels, etc., is under the supervision of the department of public works. Appropriations for harbor improvements are provided for in the annual tax levy of the board of estimates, but these must be approved by the common council.

**Port charges.**—The subject of port charges at Milwaukee is of comparatively little importance.

## OGDENSBURG, N. Y.

Ogdensburg is the most important United States port on the St. Lawrence River. It is located at the mouth of the Oswegatchie River, about 62 miles from Lake Ontario.

An extensive shoal lies between the river front of Ogdensburg and the main channel of the St. Lawrence. The harbor consists of an artificial channel 1⅞ miles in length, which runs parallel with and close to the shore and is connected with the main St. Lawrence channel by means of entrance channels 100 to 600 feet wide and from 14 to 21 feet deep. The Oswegatchie River, which enters the

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St. Lawrence at the upper limit of the city, has been improved for a short distance and forms part of Ogdensburg Harbor.[a]

**Railroads.**—Ogdensburg is served by the Rutland and the New New York Central Railroads. It is connected by car ferry with the town of Prescott, Ontario, which is situated on the opposite shore of the St. Lawrence River and is a terminus of the Canadian Pacific Railway.

**Steamship lines.**—The Richelieu & Ontario Navigation division of the Canadian Steamship Lines (Ltd.) operates one steamer for general passenger and excursion service between Ogdensburg and Montreal and Quebec on the St. Lawrence River and Toronto and Hamilton on Lake Ontario.

In addition, several other lines operating small steamers in the summer excursion trade on the St. Lawrence River call at Ogdensburg. These boats carry a small quantity of package freight.

The Rutland Transit Co. maintains a fleet of eight vessels, six of which are leased from the Western Transit Co. These vessels operate between Ogdensburg, Milwaukee, and Chicago and maintain a through freight service between the principal eastern and western rail points. The stock of the transit company is owned by the Rutland Railroad Co., the majority of whose stock is owned jointly by the New York Central and the New York, New Haven & Hartford Railroads. (See, however, page 17.)

**Commerce of the port.**—In the calendar year 1914 the water-borne commerce of the port of Ogdensburg amounted to 959,648 short tons, valued at $57,505,133. In the calendar year 1913, which was a more nearly normal trade year and is, therefore, preferable for purposes of discussion, it amounted to 1,002,722 short tons of freight, valued at $68,886,793. The receipts were 698,436 tons, valued at $42,639,459, while the shipments were 304,286 tons, valued at $26,247,334.[b]

More than 60 per cent of the entire commerce consisted of foreign trade. The imports by water at Ogdensburg in the calendar year 1913 were valued at $36,521,330, while the exports by water were valued at $5,823,434. Its location on the Canadian border adjacent to a prosperous section of Ontario and opposite the terminus of the Canadian Pacific Railway at Prescott accounts for the large volume of foreign trade at this port.

The most important receipts from the standpoint of value were raw silk, $21,972,785; miscellaneous merchandise, $5,986,470; nickel matte, $5,848,868; and grain and flour, $4,483,127. From the standpoint of tonnage the principal receipts were coal, 246,737 short tons; grain and flour, 148,698 tons; lumber, lath, and shingles, 127,893 tons; and pulp wood, 71,786 tons.

The shipments consisted of 156,489 tons of coal and coke, valued at $624,818, and 147,797 tons of miscellaneous and unclassified merchandise, valued at $25,622,516.

The large receipts of raw silk are accounted for by the fact that the Canadian Pacific Railway Co. carries a large part of the raw silk imported from Japan and China for delivery in Paterson, N. J., and other silk-manufacturing centers in the eastern section of the

[a] Lake Survey Bulletin No. 24 (April, 1915), p. 451.
[b] Report, Chief of Engineers, U. S. Army, 1914, p. 3137; idem, 1915, p. 3321.

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United States. The nickel matte is the semi-refined product of the cobalt district of Ontario consigned to plants at Buffalo and other points for further refining or for use in manufacture.

**Extent and ownership of water front.**—The harbor has a wharf frontage of approximately 2 miles on the St. Lawrence River and about one-third of a mile on the Oswegatchie River. Practically all of this frontage is privately owned, much of it being held by lumber and coal companies.

**Terminals.**—The only public wharf in Ogdensburg is located in the central harbor and has a frontage of 80 feet. It is used as a passenger landing during the summer months and is open to all water carriers without charge. The steamers of the Richelieu & Ontario Navigation Co. use this dock as a passenger landing.

The principal freight wharves at Ogdensburg are those of the Rutland Railroad Co. These wharves and warehouses are situated in the lower harbor and occupy a frontage of 2,300 feet. They are used exclusively by the steamers of the Rutland Transit Co., which carry chiefly freight and grain between Ogdensburg, Milwaukee, and Chicago.

The New York Central Railroad owns a part of a freight wharf on the Oswegatchie River, the balance being owned by a private individual. The railroad has not used this wharf for several years, but its portion, which has a frontage of 750 feet, as well as the remainder, is open for use by all water carriers on equal terms.

The Rutland and the New York Central Railroads own and maintain separate car-ferry landings on the main harbor. A car ferry operates during the entire year between these terminals and the Canadian Pacific Railway's terminal at Prescott, Ontario, which is situated on the opposite shore of the St. Lawrence, about three-fourths of a mile from the New York Central Railroad slip and 1⅛ miles from that of the Rutland Railroad.

Three small wharves, known as Plumb, Hacket, and Lyon Wharves, are used mainly for summer passenger traffic. Lyon wharf is used also by a passenger ferry that operates during the entire year between Ogdensburg and Prescott, Ontario. Several wharves, three on the main harbor and one on Oswegatchie River, are actively used by coal companies. These wharves are equipped with hoists and derricks for unloading coal from vessels to storage piles.

Two wharves are used by grain elevators, one of which has a storage capacity of 500,000 bushels and the other of 90,000 bushels. The larger elevator, that of the Ogdensburg Terminal Co., is located near the freight terminals of the Rutland Railroad Co. and is used largely for elevating grain from the vessels of the Rutland Transit Co.

The only large lumber wharf at Ogdensburg has a frontage of 1,250 feet and is located in the central harbor, but has not been used for lumber for several years. It is open to water carriers generally, and has a connection with the Rutland Railroad.

**Type of wharf construction.**—The wharves at Ogdensburg are constructed of timber cribs backed by earth filling.

**Port administration.**—There is practically no port administration at Ogdensburg, since the city is small and its commerce not large.

**Port charges.**—The principal fact to be noted in this connection is the following schedule of wharfage charges assessed on commodities

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that are handled over the wharf of the New York Central Railroad Co., but yield the company no revenue:

| | | |
|---|---|---|
| Automobiles | each.. | $0.25 |
| Horses and cattle, single | do.... | .25 |
| Horses and cattle, each additional | do.... | .15 |
| Horse and wagon | do.... | .35 |
| Sheep and calves | do.... | .05 |
| Two horses and wagon | do.... | .50 |
| Wagons | do.... | .25 |
| General merchandise | per pound.. | .03 |
| Minimum charge | | .15 |

## SANDUSKY, OHIO.

Sandusky is one of the principal coal-shipping ports on the Great Lakes. It is located on Sandusky Bay about 57 miles west of Cleveland. The harbor is in the lower part of the bay about 2 miles from Lake Erie. Dredged channels provide a minimum depth of water of 21 feet, and the water front is developed for a length of about 1.5 miles.[a]

**Railroads.**—The city is served by five railroads—the Baltimore & Ohio, the Cleveland, Cincinnati, Chicago & St. Louis, the Lake Erie & Western, the Lake Shore & Michigan Southern division of the New York Central lines, and the Pennsylvania. All of these railroads except the New York Central and the Lake Erie & Western have terminals on the water front at Sandusky. The Pennsylvania Railroad reaches Sandusky by means of the Toledo, Columbus & Ohio River Railroad, which it controls.

**Steamship lines.**—Vessels carrying bulk freight are the principal ones using the harbor at Sandusky. Several small passenger boats operate between Sandusky and the near-by islands in Lake Erie and to points on the Canadian shore. The most important passenger boats that call regularly are those of Ashley & Dustin's Steamer Line, which operates two boats daily in each direction during the summer season between Detroit and Sandusky, via Put-in Bay and other intermediate islands.

**Commerce of the port.**—The water-borne traffic at Sandusky Harbor in the calendar year 1914 amounted to 3,129,776 short tons, valued at $12,778,346. In 1913, which was a more nearly normal trade year, and is, therefore, preferable for purposes of discussion, it amounted in value to $10,593,104, and in volume to 3,253,954 short tons. The receipts were only 534,593 tons, this total including 21,810 tons (727,000 bushels) of oats, 464,540 tons of sand, and 18,018 tons of limestone. The shipments, including 2,597,934 tons of cargo coal and 103,777 tons of bunker coal, aggregated 2,719,361 tons.[a]

**Extent and ownership of water front.**—The wharf-line frontage of Sandusky Harbor is about 4 miles. Of this total, the city owns 3,120 feet, which is leased to the Toledo, Columbus & Ohio River Railroad (a part of the Pennsylvania Railroad system) under a 99-year lease. Three railroads own 8,560 feet and various private individuals own the remainder of more than 10,000 feet.

**Terminals.**—The Baltimore & Ohio Railroad Co. owns a stretch of 4,675 feet of frontage improved by a wharf of timber-crib construction. This terminal is equipped with a grain elevator of 300,000

[a] Report, Chief of Engineers, U. S. Army, 1914, p. 3064; idem, 1915, p. 3273.

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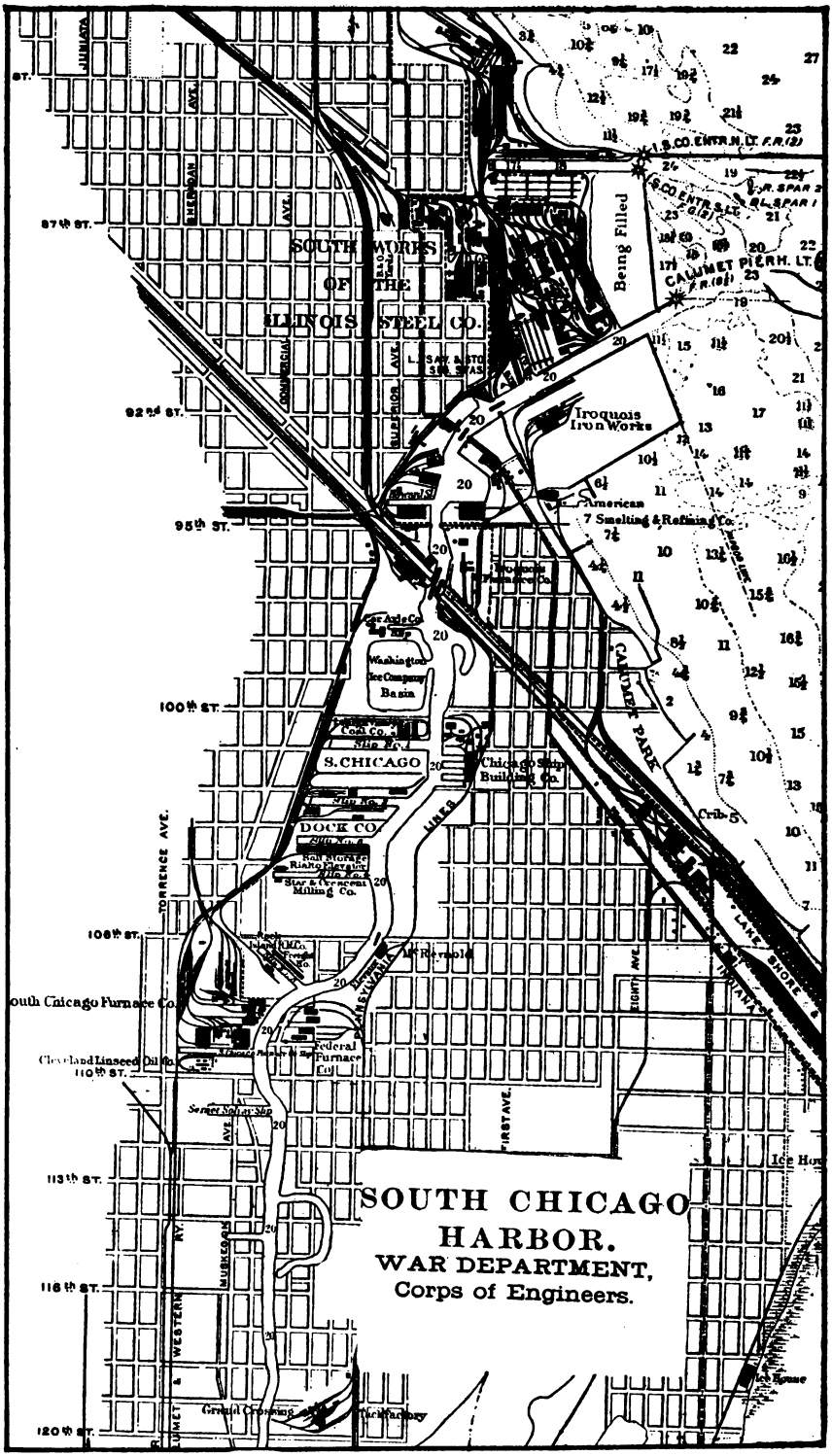


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bushels capacity and two 4-ton McMyler whirlies, in addition to 5 stiff-leg ore-unloading machines of antiquated design. There is also a large warehouse on this dock. In the calendar year 1912 the traffic handled at this terminal consisted of 68,274 tons of cargo coal, 10,914 tons of grain, and 13,000 tons of miscellaneous freight. This terminal is no longer actively used for ore traffic, but the quantity of grain and coal handled here tends to increase.

The Cleveland, Cincinnati, Chicago & St. Louis Railway Co. owns four parcels of water-front property with a frontage of 3,265 feet, all of which is improved by wharves. Two wharves are leased to coal companies, one to a lumber company, and one to a sand company. This dock is also used by the boats of the Ashley & Dustin's Steamer Line, which operates between Sandusky and Detroit.

The Pennsylvania Railroad owns two water-front lots which have a combined frontage of 620 feet and leases from the city of Sandusky a third tract which has a frontage of 3,120 feet. All three tracts are improved by wharves, which are leased to three different companies. One wharf is occupied by a bunker-coal company, another by a sand company, and the third by a company engaged in the shipment of cargo coal. The last-mentioned company, the Lower Lakes Dock Co., occupies the tract belonging to the city. The equipment of this wharf includes one McMyler car dumper with a capacity of 800 tons per hour. In the year 1912, 1,800,000 tons of soft coal were loaded into vessels at this wharf. During the year 1914 the sum of $1,000,000 was expended by the Pennsylvania Railroad Co. on this terminal in the construction of new docks and in the installation of a new car dumper with double the capacity of the old one.

The remainder of the improved frontage is used for various purposes—about 3,500 feet in connection with an amusement park, about 4,100 feet by two lumber companies, about 1,000 feet by sand and stone companies, and about 1,400 feet by fish concerns.

**Type of wharf construction.**—Most of the wharves are of timber-crib construction, the remainder being of pile-and-timber design.

**Port administration.**—Practically the only authority controlling harbor affairs at Sandusky is the Federal Government, the only regulations being those issued by the Secretary of War.

**Port charges.**—This subject is of relatively small importance at Sandusky, although it might be stated that at one dock (that of the Lower Lakes Dock Co.) a charge of 5 cents per ton of cargo and 11 cents per ton of bunker coal is made for the use of equipment.

## SOUTH CHICAGO, ILL.

South Chicago Harbor, or Calumet Harbor, as it is frequently called, is within the limits of the city of Chicago. Since, however, this harbor is about 13 miles distant from Chicago Harbor proper and is of a wholly different type—chiefly industrial and not commercial—it has been thought best to give it separate consideration in this report.

South Chicago Harbor is situated at the mouth of the Calumet River near the Indiana boundary. It is primarily a river harbor, although the lake front is improved by one terminal, the ore dock



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of the Illinois Steel Co., which is protected by breakwaters constructed by the Federal Government.

About 6.18 miles up the river from the entrance to the harbor is a place known as the Forks, where connection is made with Lake Calumet by a channel constructed at private expense. About 1.65 miles above the Forks, or about 7.83 miles from the entrance to the harbor, is the junction, or head, of the main Calumet River, where it divides into the Little Calumet and the Grand Calumet. The channel from the Forks to Lake Calumet is narrow and shallow. Lake Calumet is about 3½ miles long and about 1½ miles wide, with an average depth of only about 5 feet. The Grand Calumet is a shallow lagoon or bayou about 18 miles long. The city of Hammond, Ind., is situated on the Grand Calumet, about 2.75 miles above the junction. About 2.37 miles east of Hammond there is a connection with Lake Michigan from the Indiana Harbor Canal. The Little Calumet is about 60 miles long and is navigable for 6-foot draft to Riverdale, about 12 miles from the main river mouth.[a]

Improvements now being made will provide for a channel 200 feet wide and 21 feet deep for a distance of 5.47 miles from the inner end of the harbor entrance channel—that is, to the Forks—and ultimately for a channel 200 feet wide and 10 feet deep for a distance of 4.87 miles farther up the Grand Calumet to a point one-half mile above Hammond, Ind.[a]

**Railroads.**—Thirty-two independent rail lines enter the city of Chicago and serve the industries of the city directly by means of switch tracks or indirectly by means of belt lines. The Calumet district, which includes South Chicago, Hegewisch, and Blue Island, Ill., and Hammond, East Chicago, Whiting, Indiana Harbor, and Gary, Ind., is served by several belt and switching lines, the most important being the Belt Railway of Chicago, the Indiana Harbor Belt Railroad, the Baltimore & Ohio Chicago Terminal Railroad, and the Elgin, Joliet & Eastern Railway.

**Steamship lines.**—Since South Chicago Harbor is primarily an industrial harbor, it is used almost exclusively by bulk-freight vessels.

**Commerce of the port.**—The traffic of South Chicago Harbor consists chiefly of bulk freight, such as iron ore and coal. South Chicago is, in fact, one of the most important ore-receiving ports on the lower lakes. Largely as a result of the rapid development of the iron and steel industry in this district, the commerce of the port increased from 3,728,260 short tons in 1904 to 9,445,878 tons in 1913.[b]

The water-borne commerce in 1914 amounted to 6,549,576 short tons, valued at $162,000,344. In the year 1913, which was a more nearly normal trade year and is, therefore, preferable for purposes of discussion, it amounted to 9,445,878 tons, valued at $178,817,771, and consisted of 8,371,689 tons received and 1,074,189 tons shipped. Over two-thirds of the entire value of this traffic is accounted for by the item of "miscellaneous merchandise," the value of which was estimated at $122,288,700, or at the rate of $150 per ton. Nearly

[a] Lake Survey Bulletin No. 24 (April, 1915), pp. 204–205.
[b] Report, Chief of Engineers, U. S. Army, 1914, p. 2931; idem, 1915, p. 3155.

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two-thirds of the entire volume is accounted for by iron ore, the receipts of which were 6,229,622 short tons.[a]

The principal receipts were iron ore, 6,229,622 tons; coal, 1,245,251 tons; and miscellaneous merchandise, 755,806 tons. The principal shipments were corn, 21,308,730 bushels, or 596,644 tons; wheat, 9,075,451 bushels, or 272,263 tons; and miscellaneous merchandise, 59,452 tons. The list of shipments also includes 46,925 tons of flour; 1,696,150 bushels, or 27,138 tons, of oats; and 22,807 tons of manufactured iron, in addition to other commodities.[a]

**Extent and ownership of water front.**—From the mouth of the Calumet River to the Forks, about 6 miles above, there is an available water front of about 88,000 feet, of which about 51,000 feet have been improved, although only 22,000 feet are now in use. In addition to this river frontage, there are several thousand feet of lake frontage protected by breakwater, a part of which is used for terminal purposes by the Illinois Steel Co.

**Terminals.**—The only publicly-owned terminals are the wharves at street ends and along public highways, constructed and maintained by the city of Chicago and other cities or villages along the Calumet River. The United States Army engineer at Chicago reports that very few improvements have been made along these frontages and that consequently they are very little used at present.[b]

The principal private terminals are the docks of the iron-and-steel companies, the grain-elevator companies, and the coal companies. The map opposite page 401 shows the principal terminals on the improved section of the Calumet River.

Four steel companies have iron-ore docks. The docks of the Illinois Steel Co. occupy 6,980 feet of frontage on the lake and river. These docks have storage space for 2,750,000 tons of iron ore. One of these docks, known as the North Dock, is located on a slip on the lake front and is equipped with 15 Hoover & Mason unloading machines using 5-ton automatic buckets and having a combined unloading capacity of 3,000 tons per hour. The other, or South Dock, is at the mouth of the Calumet River and is equipped with 7 Hoover & Mason unloading machines using 6-ton automatic buckets, with an unloading capacity of 1,800 tons per hour. Both docks are equipped also with locomotive cranes for loading steel rails and have a handling capacity of 2,400 tons in 48 hours.

The Iroquois Furnace Co. occupies 2,112 feet of water front and has an ore dock that is equipped with two Brown and one Hoover & Mason unloading machines. Both types of machine use 7½-ton automatic, or clamshell, buckets and these three machines have a combined unloading capacity of 650 tons of ore per hour.

The Wisconsin Steel Co. occupies 1,186 feet of river frontage and its dock is equipped with three Brown electric unloading machines which use 6-ton automatic buckets and have an unloading capacity of 700 tons an hour.

The Federal Furnace Co. has 646 feet of river frontage and one ore dock. This dock is equipped with three Brown unloading machines

[a] Report, Chief of Engineers, U. S. Army, 1914, p. 2931.
[b] Special Report of Chief of Engineers on Water Terminal and Transfer Facilities (H. Doc. No. 226, 63d Cong., 1st sess.), p. 1026.

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that use 5-ton automatic buckets and have an unloading capacity of 450 tons per hour.

At South Chicago Harbor there are 7 grain-elevator companies operating 4 public and 7 private elevators. The 11 elevators occupied a water frontage of 7,475 feet. The public elevators are those that are declared regular under the rules of the Board of Trade of Chicago, while the private elevators are those for use of the companies operating them. The public elevators have a combined capacity of 7,500,000 bushels, while the private elevators have a storage capacity of 6,800,000 bushels.

Four large coal companies are to be found on the Calumet River water front. They occupy 4,890 feet of wharf frontage and have a storage capacity of 740,000 tons. The coal, which is mostly bituminous coal brought in vessels from various Lake Erie ports, is unloaded here by means of modern equipment. In addition to the above terminals, there are several others occupying a large amount of the river front, but these are quite inactive.

The tendency is to construct new industrial plants along the banks of the Calumet River as fast as the deep-water navigation is extended. For industrial plants, at least, South Chicago Harbor has a very considerable advantage over Chicago Harbor in that freight rates to the former are somewhat lower, the rates to the latter being high because of the congested condition of the Chicago River. South Chicago Harbor has none of this congestion and has all of the railroad advantages that the central portion of Chicago can offer, and in addition it has cheap and extensive industrial sites.

**Type of wharf construction.**—The prevailing type of wharf is of pile-and-timber construction. There is a marked tendency to the construction of slips, as is clearly indicated by the map opposite page 401.

**Port administration.**—Since South Chicago Harbor lies within the limits of the city of Chicago and its harbor affairs are not separately administered, the reader is referred to the discussion of this subject given under the head of "Chicago Harbor" (cf. p. 354).

**Port charges.**—The matter of port charges at South Chicago is relatively of no importance, since the harbor is almost exclusively used for industrial purposes or for grain.

## TOLEDO, OHIO.

Toledo is the principal coal-shipping port on the Great Lakes and an important railroad and manufacturing center. The city is located on Maumee River and Maumee Bay, at the western end of Lake Erie, about 99 miles west of Cleveland and 60 miles south of Detroit. It is also the terminus of the Miami & Erie Canal, a narrow and shallow channel not greatly used at present, which extends from Lake Erie to the Ohio River at Cincinnati.

The harbor is entered by means of a channel 400 feet wide and 23 feet deep at mean lake level, which extends from deep water in Lake Erie in a direct line to the mouth of the Maumee River, a distance of about 9 miles. In the Maumee River, from its mouth to Fassett Street Bridge, a distance of 6 miles, there is a channel 400 feet wide and 21 feet deep at mean lake level. For some distance beyond

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Fassett Street Bridge the dredged channel has a depth exceeding 19 feet for a width of 90 feet.[a]

**Railroads.**—The city of Toledo is served by the following lines of railroad: Ann Arbor Railroad; Cinicinnati, Hamilton & Dayton Railway; Cleveland, Cincinnati, Chicago & St. Louis Railway; Detroit & Toledo Short Line Railroad; Hocking Valley Railway; Lake Shore & Michigan Southern Railway; Michigan Central Railroad; Pennsylvania Railroad; Pere Marquette Railroad; Toledo & Ohio Central Railway; Toledo, St. Louis & Western Railroad; Wabash Railroad; Wheeling & Lake Erie Railroad.

The city is served also by the Toledo Terminal Railroad, which encircles the city and connects with all of the above lines.

**Steamship lines.**—The principal lines of steamships calling regularly at this port are the Detroit & Cleveland Navigation Co., the Star-Cole Line, and the White Star Line. These are passenger lines.

The Detroit & Cleveland Navigation Co. operates from the middle of June to the middle of September one boat daily in each direction between Toledo and the island of Put-in-Bay, 43 miles distant, and from April 26 to December 1 two to four boats weekly in each direction between Toledo, Detroit, and upper Michigan resorts.

The Star-Cole Line operates one boat weekly during July and August in each direction, between Cleveland, Toledo, Detroit, and Sault Ste. Marie and various intermediate points.

The White Star Line operates two boats daily in each direction between Toledo and Detroit from about June 17 to September 6, and one boat daily from April 8 to June 17 and from September 7 to October 15.

None of the regular lines of package-freight steamers owned by the trunk-line railroads call at Toledo.

**Commerce of the port.**—In point of tonnage Toledo is one of the leading ports on the Great Lakes. The value of its water-borne commerce, however, is small since the greater part of the tonnage consists of coal and iron ore.

In the calendar year 1914 the commerce of Toledo Harbor amounted to 7,166,172 short tons, valued at $22,826,168. In the year 1913, which was a more nearly normal trade year, and is, therefore, preferable for purposes of discussion, it amounted to 7,510,634 short tons, valued at $25,355,100. Receipts were 1,797,413 tons and shipments 5,713,221 tons.[b] The principal receipts were iron ore, 1,233,091 tons; sand and gravel, 373,422 tons; wheat, 92,034 tons; and flaxseed, 40,823 tons.[c]

Coal constituted more than 98 per cent of the total shipments in 1913, 5,401,323 tons of cargo coal and 214,540 tons of bunker coal being shipped during that year. The only other shipments of any importance were timber and crude oil.[b]

**Extent and ownership of water front.**—Approximately 12 miles of frontage on deep water are at present available at the port of Toledo. Practically all of this frontage, with the exception of a number of street ends and of the water front used for park purposes, is privately owned. The city of Toledo owns 12,403 feet of frontage, including 8,605 feet used for park purposes, 2,900 feet for a waterworks pumping station, and 898 feet for municipal wharves.

The water front in actual use is about 4⅔ miles, or only slightly more than one-third of the total available frontage.

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[a] Lake Survey Bulletin No. 24 (April, 1915), p. 389.
[b] Report, Chief of Engineers, U. S. Army, 1914, p. 3058; idem, 1915, p. 3269.
[c] Idem, 1914, p. 3058.

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**Terminals.**—The city of Toledo maintains nine public wharves, located at street ends. The location and the frontage of these wharves are as follows: Summit and Perry Streets, 250 feet; Jefferson Street, 84 feet; Madison Street, 75 feet; Adams Street, 86 feet; Cedar Street, 66 feet; Elm Street, 81 feet; Magnolia Street, 82 feet; Superior Street, 88 feet; Washington Street, 86 feet.

The private terminals have a wharf frontage of about 24,208 lineal feet, 15,473 feet on the west bank of the river and 8,735 feet on the east bank. Railroad companies own 15,803 feet of the developed frontage, steamship companies 202 feet, and private parties 8,203 feet.

Railroad companies use 11,163 feet frontage; steamship companies, 402 feet; lumber, sand and gravel, coal, grain, fish, and oil companies, 12,243 feet; while 400 feet of developed frontage is idle.

The principal docks at Toledo are the coal docks owned by the Hocking Valley Railway Co., the Cincinnati, Hamilton & Dayton Railway, and the Toledo & Ohio Central Railway.

The Hocking Valley terminals have a frontage of 2,950 feet and are improved by a modern coal dock and an old iron-ore dock. The terminals have rail connections with the Pennsylvania Railroad as well as the Hocking Valley Railway. The coal dock is equipped with a mechanical car dumper of the McMyler type, which has a capacity of 800 tons per hour and handled in the year 1911 2,324,491 tons of soft coal. The ore dock is equipped with 2 old-style Brown unloading machines using 2-ton shovel-filled buckets, but has not been operated for a number of years.

The terminals used by the Cincinnati, Hamilton & Dayton Railway have a river frontage of 3,100 feet and are used chiefly for soft coal and iron ore. The coal dock is equipped with one mechanical car unloader (McMyler type) with a capacity of 800 tons per hour. In the calendar year 1911, 1,875,634 tons of soft coal were transferred from car to vessel at this dock. The ore dock is equipped with two Hulett electric unloading machines, using 15-ton automatic buckets and having an unloading capacity of 1,000 tons per hour. In addition there are three whirlies (McMyler type), using 4-ton automatic buckets and having a capacity of 300 tons per hour. Vessels are loaded with crude oil by means of a pipe line at this terminal.

The Toledo & Ohio Central Railway terminals also are equipped for handling coal and iron ore. The terminals used by this railroad occupy 3,500 feet of water front, including 1,200 feet of frontage on a slip. The coal dock is equipped with one mechanical car dumper (McMyler type), designed to unload 800 tons of coal per hour. The ore dock is equipped with three Brown electric unloading machines using 5-ton automatic buckets and handling 600 tons of ore per hour.

Another important iron-ore dock is that of the Toledo Furnace Co., which occupies 975 feet of river frontage. This dock is equipped with three Hoover & Mason electric unloading machines which use 5-ton automatic buckets and handle 300 tons per hour.

One of the terminals of the Wabash Railroad is equipped for handling coal and was formerly occupied by the Delaware, Lackawanna & Western Coal Co. It has not been used in a number of years. There are three additional coal docks, none of which handles any considerable quantity in a year.

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Three terminals are occupied by grain-elevator companies. The National Milling Co. owns 500 feet of wharf front, including 320 feet of slips, and has a grain elevator of 1,500,000 bushels capacity. The East Side Iron Elevator Co. occupies 575 feet of water frontage and has a grain elevator of 1,500,000 bushels capacity. The Lake Erie Elevator Co. (Rosenbaum Bros.) occupies 300 feet of frontage on land leased from the Cincinnati, Hamilton & Dayton Railway. The elevator on this property has a capacity of 500,000 bushels of grain.

Of the water transportation lines operating between Toledo and other lake ports, the Detroit & Cleveland is the only one that owns its own dock. The White Star Line leases a 200-foot dock from the Pennsylvania Railroad.

A large tract of water front is occupied by the Toledo Shipbuilding Co., which has two dry-docks, one 675 feet over all and the other 558 feet. Another dry-dock, that of Gilmore Bros., has a length over all of 235 feet.

Five docks are occupied by lumber and timber companies, 3 by fish companies, and 11 docks are used for sand and gravel, and 1 for oil, while at 2 other docks considerable quantities of salt are handled.

**Type of wharf construction.**—Practically all of the wharves at this port are parallel to the river and are of pile-and-timber construction. Two of the most recent wharves have been constructed with timber cribs capped with concrete.

**Port administration.**—The control of the harbor is vested in the director of public service, the actual work being performed by the division of harbor and bridges. The ordinances of the city of Toledo provide:

> The director of public service shall have the general care and supervision of all navigable waters within the limits of the city of Toledo, including all waters and slips upon the land side of dock lines, but opening into public waters; and for such purpose shall inspect frequently the wharves, docks, and piers abutting upon said waters and all said waters themselves, to see that the provisions of this ordinance are closely observed.

The city council has passed a number of ordinances that deal with the movement of vessels in the harbor. The docks maintained by the city are under the control of the director of public service.

**Port charges.**—The only matter of interest in this connection is the fact that no charge is made for the use of the city docks above-mentioned. These are small docks and are used only by small craft.

## TONAWANDA, N. Y.

Tonawanda Harbor comprises the Niagara River frontage of Tonawanda and North Tonawanda, N. Y., extending three-fourths of a mile above and 3 miles below Tonawanda Creek, which separates the two cities. The harbor also includes Tonawanda Creek for a distance of 1,400 feet above its mouth, in addition to the 1¾ miles of the water front of Tonawanda Island, which lies in the river off the main shore. The depth of water throughout the harbor as thus defined is 18 feet.[a]

The Tonawandas are located on Niagara River, between Buffalo and Niagara Falls. North Tonawanda is the terminus of the new State Barge Canal. The two towns have extensive manufacturing industries and a large lumber-shipping business.

[a] Lake Survey Bulletin No. 24 (April, 1915), p. 412.

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**Railroads.**—Tonawanda is served by the Erie, the Lehigh Valley, the New York Central, and the Wabash Railroads.

**Steamship lines.**—There is comparatively little freight traffic at Tonawanda Harbor that is not carried in lumber or ore-carrying vessels. During the summer season, however, large numbers of passengers are carried by excusion steamers plying between Tonawanda and points along the shore of Grand Island and by a ferry also operating between Tonawanda and Grand Island.

**Commerce of the port.**—The water traffic at Tonawanda Harbor is unique in that practically all of the receipts are by lake and river while all of the shipments are by canal (the Erie). The entire waterborne commerce in the calendar year 1914 consisted of 521,638 short tons, valued at $8,880,909. In the year 1913, which was a more nearly normal trade year, and is, therefore, preferable for purposes of discussion, it amounted to 1,447,493 short tons of freight, valued at $15,262,391.[a] The receipts, including those via the Erie Canal (95,887 tons, valued at $1,286,794), were 1,275,397 tons, valued at $12,409,032. The shipments amounted in volume to 172,096 short tons and in value to $2,853,359.

The principal receipts were iron ore, 635,600 short tons; lumber, 300,304,787 feet b. m., or 525,533 short tons; and wood pulp, 10,385 short tons. The shipments consisted almost entirely of lumber transshipped from vessel to canal boat.

**Extent and ownership of water front.**—Approximately 5 miles of water front are available in Tonawanda Harbor, none of which is at present under public control. The State Legislature of New York in an act providing for terminals on the State Barge Canal made an appropriation of a sum not exceeding $70,000 for the acquisition of "the lands lying between the present Erie Canal and the Niagara River." This site will provide 2,700 feet of wharf front along the natural deep-water frontage of Niagara River and will be available for the largest lake vessels loaded to 20 feet draft.

**Terminals.**—Practically all of the improved water front in Tonawanda Harbor is occupied by lumber docks. An important exception is the ore dock of the Tonawanda Iron & Steel Co., which owns 1,600 feet of linear frontage. This iron-ore dock is equipped with Brown hoist unloaders.

**Type of wharf construction.**—The United States engineer in charge of harbor improvements in the Buffalo district reports that the "lumber docks are plain platform docks for receiving lumber, unloaded by hand from lake vessels or for loading by hand onto canal boats, and are of the type adapted to the enormous lumber traffic of the locality."[b]

**Port administration and port charges.**—Little can be said regarding port administration or port charges in the case of Tonawanda Harbor.

## TWO HARBORS, MINN.

Two Harbors, which ranks next to Duluth-Superior as an iron-ore shipping port, is located on the north shore of Lake Superior, 27 miles northeast of Duluth. The harbor consists of a natural bay or indentation which is about three-fourths of a mile long and one-half of a

[a] Report, Chief of Engineers, U. S. Army, 1914, p. 3119; idem, 1915, p. 3305.
[b] Special Report of Chief of Engineers, U. S. Army, on Water Terminal and Transfer Facilities, 1913. (H. Doc. No. 226, 63d Cong., 1st sess.), p. 1244.

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mile wide and is protected by breakwaters erected by the Federal Government. The depth of water over the greater portion of the harbor is 18 feet or more.[a]

**Railroads.**—The only railroad serving Two Harbors is the Duluth & Iron Range Railroad. This line is controlled by the United States Steel Corporation and is engaged almost exclusively in the transportation of iron ore.

**Steamship lines.**—The principal vessels using this port are the bulk freighters for ore and coal. The only regular line is that of the United States & Dominion Transportation Co., which operates freight and passenger boats between Duluth and points on the Canadian shore of Lake Superior.

**Commerce of the port.**—Two Harbors has developed rapidly as a port, the increase in its commerce coinciding with the development of the nearby iron-ore deposits. In 1885 its commerce amounted to 263,437 short tons of freight, valued at $876,613, while in 1913 the traffic had increased to 11,758,009 short tons, valued at $31,758,689.[b] In 1914, which, however, was not a normal trade year, it amounted to 6,668,005 short tons, valued at $16,129,988.[c]

The traffic is almost entirely outbound, the only receipts in 1913 being 372,901 tons of soft coal. The shipments in 1913 consisted of 11,284,984 tons of iron ore, 68,678 tons of lumber, and 31,446 tons of pulp wood.[b]

**Extent and ownership of water front.**—The entire developed watre front is owned by the Duluth & Iron Range Railroad Co.

**Terminals.**—The Duluth & Iron Range Railroad Co. maintains 10 piers, 1 used for coal, 1 for pulp wood, 1 for lumber, 1 for general merchandise, and 6 for iron ore.

The following is a list of the ore trestles or docks and their dimensions and capacities:

| Docks. | Length. | Width. | Height above water. | Number of pockets. | Capacity. | | Character of construction. |
|---|---|---|---|---|---|---|---|
| | | | | | Each pocket. | Dock. | |
| | *Feet.* | *Feet.* | *Feet.* | | *Tons.* | *Tons.* | |
| No. 1 | 1,376 | 51⅜ | 74 | 224 | 250 | 56,000 | Steel and concrete. |
| No. 2 | 1,280 | 49 | 57 | 208 | 150 | 31,200 | Timber. |
| No. 3 | 1,054 | 49 | 66 | 170 | 150 | 25,500 | Do. |
| No. 4 | 1,042 | 49 | 62 | 168 | 150 | 25,200 | Do. |
| No. 5 | 1,050 | 49 | 66 | 168 | 150 | 25,200 | Do. |
| No. 6 | 920 | 51¼ | 73 | 148 | 250 | 37,000 | Steel and concrete. |

The length of the ore docks is so great that no more space than necessary is left for vessels to enter and make the turns in and out of the slips and there is no space for anchorage.[a]

The coal dock has a modern handling equipment and can unload 450 tons of coal per hour. It has storage space for 160,000 tons. The pulp wood dock is equipped for transferring this commodity from railroad cars into vessels.

[a] Lake Survey Bulletin No. 24 (April, 1915), p. 82.
[b] Report, Chief of Engineers, U. S. Army, 1914, p. 2837.
[c] Idem, 1915, p. 3093.

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All of the docks are connected with the main lines of the railroad by means of spur tracks.

**Port administration.**—There is no State or municipal authority charged with the administration of this port. Moreover, no harbor regulations have been made by either the Federal Government or the local authorities. There being no harbor lines, permission to enlarge one of the docks was granted by the Secretary of War, on the condition "that vessels using the harbor as a refuge shall be allowed to tie up without expense to any unoccupied position of the structures herein authorized, provided they do not interfere with the operations of said licensee (the railroad company)."

**Port charges.**—The following wharfage charges are assessed at this port on shipments from or to points north or west of Two Harbors:

| | | |
|---|---|---|
| Carload lots | per short ton | $0.25 |
| Less than carload lots | per 100 pounds | .05 |
| Exceptions to regular charges: | | |
| Lumber received by rail for lake shipment | per short ton | .10 |
| Pulp wood (not including switching) | per cord | .05 |
| Coal (including transfer from boats to car) | per short ton | .25 |

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# CHAPTER VI.

## OHIO RIVER PORTS.

### CINCINNATI, OHIO.

The city of Cincinnati is located on the north bank of the Ohio River, 465 miles by river below Pittsburgh and about 130 miles above Louisville.

The Ohio River is now being improved by the Federal Government under a project that calls for the construction of 53 locks and dams and will provide slack-water navigation with a 9-foot depth or stage during the entire year from Pittsburgh to Cairo. A large number of dams have been built, but not in one series; as a result, slack-water navigation is not possible on extensive continuous stretches.

Dam No. 37, which is located at Fernbank, Ohio, a few miles below Cincinnati, makes possible a good stage of water in Cincinnati Harbor throughout the year. Upon the completion of Dams Nos. 38, 39, and 40, slack-water navigation between Cincinnati and Louisville will be possible, although the stage of water under present conditions permits regular daily trips to be made by the packet lines operating between the two cities. No slack-water navigation is possible above Cincinnati, since none of the dams between No. 37 at Fernbank and No. 26 near Gallipolis, Ohio, has been completed. The Cincinnati Chamber of Commerce reports, however, that "during the present season (1915) we have had continuous navigation on the Ohio, both above and below Cincinnati, and the packet lines are operating on regular schedule."

**Railroads.**—The city is served by the Baltimore & Ohio Southwestern, the Chesapeake & Ohio, the Cincinnati, Hamilton & Dayton, the Cincinnati, New Orleans & Texas Pacific, the Cleveland, Cincinnati, Chicago & St. Louis, the Cincinnati Northern, the Erie, the Louisville & Nashville, the Norfolk & Western, and the Pennsylvania Railroads. In addition, there are two smaller railroads, the Cincinnati, Georgetown & Portsmouth Railroad, which operates 51 miles of road, and the Cincinnati & Westwood Railroad, which operates only 5½ miles.

**Steamship lines.**—The following lines of packet boats call regularly at Cincinnati:

Green Line, which operates boats between Cincinnati and Pomeroy, Ohio, with stops at intermediate points, and also between Cincinnati and Charleston, W. Va., and intermediate points. During a portion of the year daily service is maintained on both routes, but during most of the year three sailings weekly in each direction are made.

Cincinnati & Memphis Packet Line, which operates one boat every two weeks in each direction between Cincinnati and Memphis and intermediate points on the Ohio and Mississippi Rivers.

Louisville & Cincinnati Packet Co., which operates one boat daily in each direction between Cincinnati and Madison, Ind., and between Cincinnati and Louisville, Ky.

Pittsburgh, Cincinnati & Louisville Packet Line, which operates one boat weekly in each direction between Cincinnati and Pittsburgh.



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Twenty-two steamers, with a total tonnage of 10,823 tons, were engaged in the freight and passenger traffic between Cincinnati and other ports in the calendar year 1913.[a]

During 1913 the number of arrivals and departures of freight and passenger boats operating between Cincinnati and various ports were as follows:[b]

| Points of service. | Arrived. | Departed. |
|---|---|---|
| Memphis and lower Mississippi | 9 | 9 |
| Pittsburgh and Wheeling | 49 | 50 |
| All other points | 1,216 | 1,225 |
| Total | 1,274 | 1,284 |

**Commerce of the port.**—The water-borne commerce handled at Cincinnati in the calendar year 1913, as reported by the Cincinnati Chamber of Commerce, exceeded 2,500,000 short tons. A detailed list of commodities is given in the sixty-fifth annual report[c] of that organization, but the commodities are reported, in most cases, in ordinary units and not in tons and no values are shown. The principal item in the commerce of the port is bituminous coal, the receipts being 1,935,994 tons and the shipments 357,313 tons. Other important items were live stock and packing-house products, groceries, wines, liquors, tobacco, and general merchandise.

**Extent and ownership of water front.**—The estimated length of water front at Cincinnati is 22 miles. The city owns about 7,594 feet, of which 3,369 feet are used for commercial or industrial purposes, the balance being used for waterworks, pumping stations, and parks.

None of the railroads holds any water front devoted to commercial purposes, but the Pennsylvania Railroad and the Baltimore & Ohio Southwestern Railroad own a considerable amount of frontage adjacent to their rights of way along the bank of the river.

**Terminals.**—The only publicly-owned terminal consists of a paved sloping wharf or levee about 500 feet wide. This wharf is located close to the commercial section of the city and covers a frontage of two blocks, or about 826 feet. The wharf has no handling facilities and no railroad connection, although a connection might easily be made.

Practically the entire space at the public wharf is occupied, under lease, by the wharf boats of the Louisville & Cincinnati Packet Co., the Coney Island Wharf Co., and the Green Line. These wharf boats, which are landings adjustable to the stage of the river, occupy frontages of 300 feet, 263 feet, and 200 feet, respectively. The Cincinnati & Memphis Packet Line steamers are accommodated at the wharf boat of the Coney Island Wharf Co.

Street ends and other river frontage owned or controlled by the city are leased to various coal companies. The Marmet Coal Co. occupies the frontage at the ends of Central Avenue, Plum Street, and McCullough Street; T. J. Hall & Co., the foot of Ludlow Street;

[a] Sixty-fifth Annual Report (1913) of Cincinnati Chamber of Commerce, p. 147.
[b] Idem, p. 146.
[c] Idem, pp. 144, 145.

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and the Trum Coal Co., the foot of Mill Street. The Campbells Creek Coal Co. occupies frontage west of Mill Street; T. J. Hall and Co., frontage south of West Fifth Street; and J. R. Ware & Son, frontage west of Wood Street.

The following is a list of the owners of the principal terminals along the river front at Cincinnati, as reported by the Chief of Engineers, United States Army, in a special report on Water Terminal and Transfer Facilities:[a]

| | Character of terminals |
|---|---|
| City of Cincinnati | Paved wharf. |
| Do | Coal incline. |
| Do | Paved wharf. |
| Do | Do. |
| Marmet Coal Co | Coal incline. |
| Collins & Harteg Co | Do. |
| Cincinnati Gas Co | Do.[b] |
| Winifrede Coal Co | Do. |
| C. Crane & Co | Log hoists. |
| Marine R. R. Co | Log hoist. |
| C. C. & P. P. Co | Wharf boat. |
| Monongahela River Consolidated Coal & Coke Co | Mooring place. |
| Whetstone Coal Co | Coal incline. |
| T. J. Hall & Co | Paved wharf. |
| Louisville & Cincinnati Packet Co | Wharf boat. |
| J. R. Ware & Son | Miscellaneous. |
| Marmet Coal Co | Coal incline.[b] |
| J. Blair Brick Co | Brick. |
| Coney Island Co | Wharf boat. |
| Cincinnati Gas Works | Coal incline.[b] |
| Reliance Coal Co | Do.[b] |
| Trum Coal Co | Do.[b] |
| C. C. Coal Co | Do.[b] |
| Q. C. Coal Co | Do.[b] |
| Pittsburgh Coal Co | Do.[b] |
| Charles Sadler | Do.[b] |
| Cincinnati Cooperative Co | Miscellaneous. |
| United States Cast Iron Pipe & Steel Co | Coal incline. |

The coal inclines are equipped with derricks and steam hoists for elevating coal from the river craft.

**Type of wharf construction.**—The public wharves are of the sloping-levee type peculiar to ports along the Mississippi River.

**Port administration.**—The port is under the control of the municipal government, the administration authority being vested in the superintendent of public properties, who is appointed by the director of public service and has general supervision over all property owned by the city. A wharfmaster has charge of the city wharf and is assisted by two day laborers.

The receipts of wharf rentals in 1914 were $6,707.78, and the disbursements $1,811.95, including a $720 salary paid to the wharfmaster and $1,053 in wages paid to laborers.

**Port charges.**—The prevailing charge made for mooring wharf boats at the city wharf is 50 cents per 100 feet per day.

## PITTSBURGH, PA.

The port of Pittsburgh, as defined by the Chief of Engineers, United States Army, comprises that portion of the Ohio River between the confluence of the Allegheny and the Monongahela,

[a] House Document No. 226, Sixty-third Congress, first session, pp. 957–958.
[b] Has railroad connection.

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which is known as the Point, and Davis Island Dam, a length of 4.7 miles; that portion of the Allegheny between its mouth and Aspinwall, a distance of 7 miles; and that portion of the Monongahela between its mouth and McKeesport, a distance of 15.5 miles. The length of the harbor is, therefore, 27.2 miles and the length of shore front 54.4 miles.[a]

The active portion of the harbor, which is called the lower harbor, extends over 8 miles of the rivers, from Davis Island Dam to the confluence of the Allegheny and Monongahela Rivers, up the Allegheny a short distance, and up the Monongahela a longer distance.

The United States Army engineer at Pittsburgh reports the average widths of the harbor at pool-full surfaces to be as follows: On the Ohio, about 1,100 feet; on the Allegheny, about 930 feet; and on the Monongahela, from 750 feet to 900 feet. Parts of the channel and harbor are from 10 to 20 feet deep, but the maximum draft that can be carried over the shoalest portions of the channel is barely 8 feet at pool stage.[a]

The Ohio River is now in process of improvement by means of locks and dams which will provide a minimum navigable depth throughout the year from Pittsburgh to the Mississippi River at Cairo, Ill. In adopting the 9-foot project the rivers and harbors act of June 25, 1910, provided that the work should be carried on "with a view to the completion of such improvement within a period of 12 years." At present, however, the navigable depth of the Ohio in the dry season of summer and fall is sometimes less than 2 feet.[b]

Slack-water navigation throughout the year is provided in the Monongahela by a series of 15 locks and dams between Pittsburgh and a point on the West Fork River above Fairmount, W. Va., a distance of 131 miles. Below Morgantown, W. Va., controlling depths at normal stages vary from 5 to 6 feet at the several old locks and from 8 to 8.5 feet at the new locks, while at the new locks above Morgantown the depth is uniformly 7 feet. In the section of the river close to Pittsburgh depths from 8.5 to 11 feet are maintained even at low stages of water.[c]

The Monongahela is the most active section of the port of Pittsburgh, numerous coal mines and steel plants lining its shores in an almost continuous stretch for a number of miles. The steel industry in the Pittsburgh district owes much to the fact that extensive deposits of excellent coking coal lie close to the shores of the river. The improvement of navigation on the Ohio which permits barges to operate throughout the year from mines on the Monongahela has made it possible for new and extensive steel plants to be constructed on large areas of frontage formerly unutilized. The United States Army engineer in charge of the Pittsburgh district reports that "one large consumer transports coal by river a distance of 50 miles at a total cost of less than 6⅔ cents per ton, including all charges, while the corresponding rail rate is about 50 cents per ton."[d] The Monongahela is

[a] Report, Chief of Engineers, U. S. Army, 1914, p. 1024.
[b] Idem, p. 1011.
[c] Idem, p. 1014.
[d] Idem, p. 1015.

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said to be "admittedly the most conspicuous example of successful slack-water improvement in the United States."[a]

Only the lower section of the Allegheny River is available for commercial purposes, low fixed bridges presenting serious obstructions to navigation on the upper section. Slack-water navigation for a distance of 23 miles from the Point is maintained by three locks and dams, but the most active section is the pool controlled by Dam No. 1, which is about 5.5 miles long and has a navigable depth of 5 to 6 feet.[b]

**Railroads.**—From the standpoint of tonnage Pittsburgh is said to be the most important railroad center in the United States. This is due largely, of course, to the great extent of the iron and steel, coal and coke industries in the Pittsburgh district.

The city is served by the Baltimore & Ohio, the Bessemer & Lake Erie, the Buffalo, Rochester & Pittsburgh, the Pennsylvania, the Pittsburgh & Lake Erie, the Wabash Terminal, and the Wheeling & Lake Erie Railroads. In addition to the above trunk-line railroads, there are a number of local connecting and switching railroads, such as the following:

Allegheny & South Side Railway, which operates a short line of 5 miles that connects with the leading railroads and furnishes switching facilities for many industries located on the south side of the Monongahela River.

McKeesport Connecting Railroad, which is owned by the National Tube Co. of the United States Steel Corporation and operates 18 miles of road in performing switching service between the various railroads entering McKeesport and the various plants of the National Tube Co.

Monongahela Connecting Railroad, which is owned by the Jones & Laughlin Steel Co. and operates 36.43 miles of road connecting at various points with the Baltimore & Ohio, the Pennsylvania, and the Pittsburgh & Lake Erie Railroads and furnishing switching facilities between its plants and other industries on both sides of the Monongahela River.

Northern Liberties Railway, which operates 1½ miles of terminal-switching railroad at Pittsburgh.

Pittsburgh, Allegheny & McKees Rocks Railroad, which is owned by interests closely connected with the Pressed Steel Car Co. This line connects with a number of railroads and performs switching service for a number of industries in the McKees Rocks section. In addition, this company operates a ferryboat that makes seven round trips daily, except Sunday, between Pittsburgh and McKees Rocks.

Pittsburgh & Allegheny River Railroad, which operates 2 miles of track connecting the Park plant of the Crucible Steel Co. of America with the Baltimore & Ohio and the Pennsylvania Railroads at Pittsburgh.

Pittsburgh & Ohio Valley Railway, which operates 2.33 miles of road at Allegheny and Neville Island, Pa. This line connects with the Baltimore & Ohio, the Pennsylvania, and the Pittsburgh & Lake Erie Railroads.

Union Railroad, which is an affiliation of the Bessemer & Lake Erie Railroad Co., and therefore of the United States Steel Corporation. This railroad operates 44 miles of main line, 12.3 miles of branch lines, and 141 miles of sidings and yard tracks.

The Wabash Pittsburgh Terminal Railway, which operates a line known as the West Side Belt Railroad. The latter railroad extends to Clairton, 21 miles south of Pittsburgh, while the former is the road by means of which the Wheeling & Lake Erie branch of the Wabash Railroad system secured an entrance into the city of Pittsburgh.

**Commerce of the port.**—The water-borne commerce of Pittsburgh harbor in the calendar year 1913 amounted to 13,308,796 short tons, for which no value is reported. In 1914 it amounted to 11,143,390

[a] Report, Chief of Engineers, U. S. Army, 1914, p. 1018. [b] Idem, p. 1019.

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short tons. The following table[a] shows the quantity of the principal commodities handled in 1913 and 1914:

| Commodities. | 1913 | 1914 | Commodites. | 1913 | 1914 |
|---|---|---|---|---|---|
| | *Short tons.* | *Short tons.* | | *Short tons.* | *Short tons.* |
| Coal | 10,415,378 | 8,719,079 | Boats, new | 6,722 | 7,756 |
| Sand | 1,244,564 | 1,065,215 | Tar | 4,836 | 1 |
| Gravel | 1,217,807 | 1,001,673 | Bottoms, coal boat (new) | 3,420 | 1,152 |
| Waste material | 200,128 | 165,357 | Coke | 3,267 | ..... |
| Iron and steel products | 125,377 | 110,275 | All other | 4,804 | 8,569 |
| Merchandise | 26,010 | 20,804 | | | |
| Acid | 30,651 | 27,903 | Total | 13,308,796 | 11,143,390 |
| Lumber and timber products | 25,832 | 15,606 | | | |

The following extract from the Annual Report of the Chief of Engineers, United States Army, for 1914,[b] describes the general character of the traffic movement in Pittsburgh Harbor:

The chief commercial uses of the harbor are the delivery of coal, sand, gravel, iron and steel products, and other material to mills, furnaces, steel plants, etc., the accommodation of packet lines whose routes terminate at the harbor, the mooring of coal fleets awaiting rises in the Ohio before proceeding to their destination on that river or on the Mississippi, and the mooring of timber rafts, barges, and new boat bottoms coming down the Allegheny River on rises. Besides coal, large quantities of steel rails, wood ties, sheet iron, wire nails, etc., are shipped by barges to the lower river market. Timber and other articles are shipped into the harbor from lower Ohio River points.

In the calendar year 1913, out of 10,415,378 tons of coal brought into the harbor, 7,786,481 tons (about 75 per cent) were handled by various industrial interests in the harbor. Of the total tonnage, 13,308,796 tons of all materials, entering the harbor 10,541,765 tons (79 per cent) were handled in the harbor proper.

Of the coal shipments in the harbor about 1,250,000 tons were transferred from water to rail for shipment to other points. Also a considerable amount of sand, gravel, and other material was transferred from water to rail for shipments to destination.

Another interesting description of the traffic in Pittsburgh Harbor is given in the following quotation from the Report of the Flood Commission of Pittsburgh.[c]

It is notable that while there has been a manifest decrease in water-borne traffic on a majority of the rivers and inland waterways of the country, the aggregate tonnage on the Ohio has been well maintained, and that on the Monongahela has steadily increased, reaching in 1907 about 12,000,000 tons. The total volume of traffic on the Ohio and Monongahela Rivers is estimated at about 25,000,000 tons annually. The principal cargo is coal, about 70 per cent of which is consumed in the Pittsburgh district. The movement of sand and gravel has increased considerably and is next in importance to that of coal. The importance of the navigation on the Monongahela to the Pittsburgh district is emphasized by the fact that more than half the coal to Pittsburgh is carried by water, while of the total coal tonnage to and through Pittsburgh about 30 per cent is by river.

About 37 per cent of this coal is moved by one large company, and the balance by a number of smaller companies and by the boats of several large corporations, which maintain very efficient fleets for bringing the coal from their mines along the Monongahela to their mills. The barges are handled in comparatively small tows at Pittsburgh and above, but when destined for points lower down the Ohio or Mississippi they are assembled in fleets carrying from 12,000 to 20,000 tons; while after passing the Falls of the Ohio, at Louisville, the fleets are enlarged to from 35,000 to 50,000 tons and carried downstream by larger towboats. It is stated that coal has been shipped in these fleets from Pittsburgh to New Orleans at a rate less than 0.4 mill per ton-mile.

[a] Report, Chief of Engineers, U. S. Army, 1914, p. 2642; idem, 1915, p. 2978.
[b] Idem, 1914, p. 1026.
[c] Pp. 231-232.

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The boats used in the coal trade are divided by the rivermen into two classes: (1) Coal barges, 135 feet long, 26 feet beam, and 8½ feet deep, costing $1,600, carrying 550 short tons of coal and employed mainly in the trade to Cincinnati, Louisville and other Ohio River points; (2) coal boats, 175 feet long, 26 feet beam, and 10 feet deep, costing $850, carrying from 1,000 to 1,200 tons, and employed chiefly in the "long river" trade to New Orleans, where they are sold for firewood, etc. The decked barges used for carrying down steel, nails, wire, etc., and for bringing back molasses, sugar, lumber, etc., are 225 feet long, 36 feet beam, and 10 feet deep, costing from $6,000 to $20,000. The use of steel barges in the Ohio River coal trade is as yet only experimental, but a number have been built by one of the large corporations, and they are claimed to give excellent service. It is maintained by experienced river men that the fixed charges and maintenance cost are so great as to make their economical use impracticable; but it is believed that this is only because, under present river conditions, the average number of trips to the southern market is only 1.8 per year, and that when the improvement of the Ohio by locks and dams is completed steel barges will doubltess come widely into use.

The towboats are of various sizes, the largest being about 500 tons and having 1,000 horsepower. They are all of the stern-wheeled type, with the boiler room and stacks well forward. There are generally two stacks, placed abreast of each other, with sway bracing between, and hinged so that they can be lowered in case of insufficient clearance under bridge.

The total commerce of the Monongahela River at Pittsburgh in the calendar year 1913 is estimated at 12,039,175 short tons. "This estimate is made by taking all the downstream tonnage at Lock 3, except iron-and-steel products, the downstream tonnage of iron-and-steel products at Lock 1, and all upstream tonnage at Lock 1, plus the coal mined and shipped in Pools 1 and 2." [a]

The downstream tonnage at Lock 3 amounted to 10,242,786 short tons and consisted chiefly of soft coal (10,081,480 tons) and sand and gravel (158,286 tons). The downstream tonnage of iron-and-steel products at Lock 1 was 25,964 short tons. The upstream tonnage at Lock 1 was 1,521,435 short tons and consisted of 1,404,909 tons of sand and gravel, 91,270 tons of iron-and-steel products, 19,756 tons of lumber, pit posts, ties, etc., in addition to 4,500 tons of coal and 1,000 tons of general merchandise. The coal mined and shipped in Pools 1 and 2 was 249,605 short tons.[b]

**Extent and ownership of water front.**—Within the generally accepted limits of the port of Pittsburgh there are about 54.4 miles of river frontage. The city of Pittsburgh owns about 6.5 miles, railroads own 26 miles, and various iron-and-steel, coal, coke, and other industrial and private interests own about 21.9 miles.

The frontage owned by the city includes some of the most important portions of the river front. The most valuable section is the tract on the north bank of the Monongahela from the Point to Grant Street. This tract has a frontage of 4,380 feet and lies close to the commercial center of the city. The city also owns frontage on the south bank of the Allegheny, one tract extending from the Point to Eleventh Street and being close to the commercial center, the other extending from Fortieth to Forty-fourth Streets, a stretch of about 1,420 feet. On the south bank of the Monongahela the city owns two parcels with a combined frontage of about 1,900 feet; the title to much of this, however, is claimed also by the Pittsburgh & Lake Erie Railroad Co. The city owns more than 3½ miles of frontage on the north bank of the Allegheny and Monongahela Rivers. The city holds title to the im-

[a] Report, Chief of Engineers, U. S. Army, 1914, p. 2608. [b] Idem, pp. 2605-07.



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portant sections on the north bank of the Monongahela and the south bank of the Allegheny by virtue of a grant which was made in 1784 by the heirs of William Penn and contained the stipulation that the frontage should forever be used as a city wharf.

Much of the river frontage is owned by railroads, and of this property a considerable portion was acquired at great cost. The United States Army engineer in charge of the Pittsburgh district reports that "in some cases as much as $6 to $10 per square foot was paid for riparian rights." He states also that—

> On the left bank of the Monongahela, between Eighth Street, Pittsburgh, and West Street, Homestead, a distance of 5.9 miles, there is no street or road leading to the river, all having been closed. In some cases these streets and roads have been closed by the municipal authorities at the request of corporations. In others access was simply cut off by the railroads, either by removing the crossings, which have been put in by them, or adding additional tracks without crossings and later removing the existing ones. Along the rivers outside of the harbor the practice has been for the municipalities to vacate streets leading to the river in the interests of the railroads and manufacturing plants. In one case the borough of Donora, situated on the Monongahela River, with a population of about 6,000 and a river frontage of 1½ miles, has only one place where there is access to the river, this being an unimproved road on which there is little, if any, business handled. In other places there has been only one opening left, which is usually at right angles to the river, and for this reason has an almost prohibitive grade for vehicle traffic.

The Baltimore & Ohio Railroad has tracks along the north shore of the Monongahela for a distance of nine blocks east of the frontage held by the city and for a distance of about 2 miles at a point farther to the east. Tracks of this railroad also parallel the north bank of the Ohio and Allegheny Rivers along nearly the entire frontage of the former city of Allegheny.

The right of way of the Pittsburgh & Lake Erie Railroad lies close to the south banks of the Ohio and Monongahela Rivers.

The Pennsylvania Railroad Co. occupies small sections along the north and south shores of the Allegheny River.

The Monongahela Connecting Railroad, a subsidiary of the Jones & Laughlin Steel Co., occupies considerable frontage on the north bank of the Monongahela River adjacent to the steel plants of the latter company and extending beyond it. Tracks of the Pittsburgh Junction Railroad lie close to the south bank of the Allegheny River from Eleventh Street to Thirty-first Street.

**Terminals.**—Reference has already been made to the water-front property owned by the city of Pittsburgh and to the valuable location of the tracts extending eastward from the Point on the Monongahela and Allegheny Rivers. On the Monongahela section is located the principal wharf maintained by the city. This wharf, which is known as the Monongahela Wharf, is of the sloping-levee type and is paved with rough granite blocks. It extends three blocks west from Smithfield Street Bridge and is located close to the main business section of the city. There is no railroad connection, although the tracks of the Baltimore & Ohio Railroad could easily be extended to this wharf.

Provision is made for the mooring of four wharf boats along this wharf, the wharf boats being used as landings by the packet lines. A certain space, about 5,250 feet, is kept open for casual boats that may wish to land there. West of this space the frontage is mostly unpaved and is leased to coal companies for mooring coal barges, etc., the principal lessee being the Monongahela River Consolidated Coal

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& Coke Co., which frequently has more than 1,000 coal barges with upward of 1,000,000 tons of coal collected at this point awaiting a rise in the Ohio River before being able to move down to Cincinnati, Louisville, and other points.

The frontage owned by the city on the south side of the Allegheny River from the Point to Eleventh Street is referred to in the city ordinances as the Duquesne Wharf. This frontage, is, however, unimproved, but the privilege of mooring boats along the shore is leased to various coal, sand, and gravel companies at rates of $1 and $1.50 per front foot per year.

The city ordinances refer to two other wharves similar to the Duquesne Wharf—the North Side Wharf on the Allegheny and Ohio Rivers in old Allegheny and the Monongahela South Side Wharf on the south side of the Monongahela River. Mooring and other privileges along these frontages are leased at fixed rates per front foot per year.

The city owns a dock at the foot of Eighth Street, Pittsburgh, on the south shore of the Allegheny. Apparently this dock is under the control of a private individual to whom the dock is leased on a percentage basis, the city receiving 25 per cent of the gross receipts.

An excellent general idea of the privately-owned terminals at the port of Pittsburgh is furnished by the following statement taken from a special report of the Chief of Engineers, United States Army:[a]

The terminal facilities on the Monongahela River consist largely of coal-mine tipples, coal hoists of manufacturing plants, hoists handling sand and gravel, and the various kinds of wharves and wharf boats.

The wharves handle both in and out bound material, and with respect to the efficiency of these terminals in the case of tipples and hoists, they are designed and used for a specific purpose and apparently serve the interests to the full extent. These tipples and hoists, of course, are owned by private individuals and concerns, and in no case on the Monongahela or on the Allegheny or Ohio are they open to the public. The wharves along the river are, as a rule, controlled by the municipality and are open to the use of water carriers, subject to the payment of a small rental. At Pittsburgh the wharves were set aside by the Penn grant to be used as wharves and landings, charges for rental being made for the maintenance of the wharf.

On the Allegheny River the terminal facilities consist principally of derricks and McMyler hoists, either stationary or floating. Coal, sand, gravel, and steel are the principal materials handled. One steel concern ships annually about 150,000 tons of billets from its plant on the Allegheny to its several plants on the Monongahela. There are no packets operating on the Allegheny River. The development of terminal facilities along this river is seriously hampered by the eight low bridges at its mouth, the clearances of which range from 27.7 to 36 feet above pool.

On the Ohio River the hoists between the State line and Pittsburgh are of the McMyler stiff-leg and derrick-bucket type, operated mostly by steam and electric power. There are four packet lines operating on the river, and a movement is now under way to consolidate these lines and at Pittsburgh to make collections of heavy products by a system of lighters, thus saving the manufacturers the necessity of hauling their products to the wharf.

On the Monongahela, Allegheny, and Ohio Rivers, where physical connections exist, there are found to be private railroad sidings, which are built and operated under agreement with the different railroads in that vicinity. Upon investigation it appears that no contract exists in the Pittsburgh district between water carrier and railroads for interchange of traffic by prorating as to such long-distance traffic as may be desired to be carried partly by rail and partly by water.

A detailed description of each terminal in the port is also given in this report.[b]

[a] Water Terminal and Transfer Facilities, 1913 (H. Doc. No. 226, 63d Cong., 1st sess.), pp. 967-68.
[b] Idem, paster sheets following p. 969.

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**Type of wharf construction.**—The prevailing type of wharf construction has been described in the section on terminals.

**Port administration.**—The port is under the control of the municipal authorities. The chief administrative officer is the superintendent of the bureau of city property, which is a division of the department of public works. The city wharf on the Monongahela River is in charge of a wharfmaster, who receives a salary of $2,700 a year. The Eighth Street Dock is in charge of a dock master, who receives 75 per cent of the receipts.

Receipts from wharfage, landing privileges, leases of water front, etc., in 1913, exclusive of those of Eighth Street Dock, amounted to $22,128.55, while expenditures amounted to $10,377.03. The receipts at Eighth Street Dock were $3,615.84, of which the city received $903.96, or 25 per cent, and the dock master the balance.

**Port charges.**—*Dockage.*—The charges for dockage at the municipal wharves are as follows:

| | | |
|---|---|---|
| Passenger or freight boat, barge, or vessel making— | | |
| One regular daily trip | per landing | $1.00 |
| Two regular daily trips | do | 2.00 |
| One regular trip weekly | do | 2.50 |
| Excursion boat (regular): | | |
| Less than 100 tons | per year | 25.00 |
| 100 tons or more | do | 50.00 |
| Harbor or pool boats | do | 20.00 |
| Small harbor tugs | do | 10.00 |
| Dredge boats | do | 20.00 |
| Small pleasure boats | do | 5.00 |

The packet lines operating on the Ohio maintain wharf boats at the Pittsburgh Wharf on the Monongahela, the charge for each being $100 per year. Provision is made for four wharf boats. A considerable space at this wharf is kept open for the use of boats having no landings of their own.[a]

Landings at the several wharves may be rented by the year. At the lower Monongahela Wharf near the Point the rent is $2.50 per front foot per year, while at the Duquesne Wharf, on the Allegheny near the Point, the rent is $1 and $1.50 per front foot.[a]

*Wharfage.*—No charge is made for commodities handled over the wharves.

[a] Ordinances of the Select Council, series 1910–11, file No. 992, sec. 8.

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# APPENDICES.

## Appendix A.—SCHEDULE USED IN THIS INVESTIGATION.

DEPARTMENT OF COMMERCE,

BUREAU OF FOREIGN AND DOMESTIC COMMERCE.

WASHINGTON.

### WATER TERMINALS IN THE UNITED STATES.

[NOTE.—The answers to many of the questions in this schedule will no doubt be found in the annual reports of port officers. Wherever this is the case such a notice may be made in connection with the particular question involved. In all cases where reports and maps covering the water front are available they should accompany the schedules.]

Port of....., Year ending.....
Information supplied by.....
Official title.....
Post-office address.....

#### I. ADMINISTRATION.

1. Is the port under the control of the State or of the municipal authorities?.....
2. Is the administrative authority exercised through a harbor board, dock board, bureau, or division of the department of public works, port warden, or other official or body?.....
3. How and for what terms are the chief administrative authorities and executive officers chosen?.....
4. Give the number of officers and employees and a brief statement of their powers and duties.....
5. If available, supply copies of the laws and regulations governing the harbor officials and employees, and of blank forms used in the transaction of business.
6. Are the acts of the officials mentioned in inquiry 2 final or are they subject to approval by other municipal or State authorities?.....

#### II. WATER FRONT.

(All answers to questions under this head should be in either miles or feet.)

1. Extent of water front?.....
2. How much of this is publicly and how much privately owned?.....
3. How much of the water front is in actual use?.....
4. How much of the publicly-owned water front is leased to—
   (*a*) Railroad companies?.....
   (*b*) Steamship companies?.....
   (*c*) Wharf and dock companies?.....
   (*d*) Industrial companies?.....
5. How much of the privately-owned water front is owned by—
   (*a*) Railroad companies?.....
   (*b*) Steamship companies?.....
   (*c*) Wharf and dock companies?.....
   (*d*) Industrial companies?.....
6. How much of the undeveloped water front can be economically brought into use?..



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### III. DOCKS AND WHARVES.

1. Number of docks and wharves owned by the public?.....
   Number privately owned?.....
2. Character and extent of each? (Here give in as great detail as you can the type, kind of construction, etc.).....
3. If available, please furnish an official map of the harbor, showing public and private docks, etc.
4. Are the publicly-owned wharves and docks also publicly operated? If not, how are they operated?.....
5. If publicly-owned wharves are leased, upon what terms and for what period are the leases made?.....
6. Is any public authority exercised over privately-owned docks and wharves? If so, what? (Give copies of laws and regulations if available.).....
7. Are privately-owned or leased docks or wharves used exclusively by the owners or lessees? If not, in what other way are they used?.....
8. If wharfage facilities for certain lines or vessels are granted under lease, what rights has the lessee under the lease, such as privilege of using shed and pier, surface for storage, and exclusive or preferential use of facilities?.....
9. What obligations are imposed upon lessees with regard to repairs, dredging, fire insurance, etc.?.....
10. What is the basis of charge for leased docks? (Supply copy of standard form of lease, if available.).....
11. Are the railroad docks extensive and well equipped?.....
12. Give the names of the more important railroads on the water front.....
13. Give the names of the more important dock companies.....

### IV. CHARGES.

(In answering questions 1 and 2 distinction should be made between publicly and privately owned docks and wharves.)

1. What are the wharf or harbor charges and the method of levying the same—
   (*a*) For transient boats, such as coastwise or trans-Atlantic tramp steamers?
   .....
   (*b*) For regular lines, coastwise or trans-Atlantic?.....
   (*c*) For river and lcoal craft, such as canal barges, etc.?.....
2. If certain docking facilities are granted under preferential berths, revocable permits, or direct wharf charges—
   (*a*) What are the terms of occupancy?.....
   (*b*) How are charges collected?.....
   (*c*) On what basis are charges made—
      (1) On the tonnage, net or gross, of a vessel?.....
      (2) Per foot of length of vessel?.....
      (3) Per ton for different classes?.....
      (4) Per ton of cargo?.....
      (5) Flat rate per day?.....
3. What are the charges for pilotage and how are they regulated?.....
4. What are the towing charges and how are they regulated?.....
5. Is lightering ever necessary; and if so, what are the charges?.....
6. Under what conditions, if any, do private owners or lessees allow privileges to vessels or cargoes free of charge?.....
7. Can all vessels at all times find accommodation upon equal terms? If not, why not?
   .....
8. What are the railroad switching charges to and from docks and wharves?.....
9. If switching or belt railroads are privately owned, give terms and charges for service.....

### V. PORT EQUIPMENT.

1. What are the methods of freight handling in the harbor?.....
2. Is the harbor equipped with telphers, cranes, and other mechanical appliances, or is ships' tackle largely used?.....
3. Is there any special organization of facilities to accommodate—
   (*a*) Industries?.....
   (*b*) Through freight?.....
   (*c*) Local freight?.....
   (*d*) Passenger traffic?.....

(Supply copy of the schedule of dock charges if available.)

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4. Are there special facilities for loading, unloading, or transferring cargo, coal, ore, lumber, grain, or any special commodities of the port? Describe them.....
5. By whom is stevedoring done? By private concerns, steamship lines, or the harbor authorities? .....

VI. RAILROAD CONNECTIONS.

1. Are there belt lines or other railroads connecting the different trunk lines with the wharves? .....
2. Describe the system of such railroad connections. (If available, supply a map showing track arrangements.).....
3. Are these connecting railroads owned by the public authorities or are they privately owned and operated? .....
4. If publicly owned, are they operated by the public authorities or through a company under lease? .....
5. Are the connecting railroads self-sustaining? .....
6. Do they rent or own their own rolling stock, such as locomotives and cars? .....
7. Do the connecting railroads afford equal facilities on equal terms to all shippers? If not, explain inequalities.....
8. What are the operating rules for procuring cars, regulating length of time on siding, transfers to trunk lines, etc?.....
9. What is the mileage of tracks?.....
10. What are the charges over the same? (Give schedule of charges if available).....
11. Are the charges based on the switching, so much per car, or so much per ton of goods handled?.....
12. If there are no belt-line or other connecting railroads, what other railway or trackage facilities are there on the dock?.....
13. What obstacles are there in the way of establishing railway connections with all wharves?.....

VII. WAREHOUSES.

1. Is there a system of warehouses in connection with the port terminals?.....
2. Are the warehouses owned by the public authorities or are they privately owned and operated?.....
3. If publicly owned, are they operated by the public authorities or through a company under lease?.....
4. What are the terms of occupancy and what are the charges?.....
5. On what are the charges based, so much per cubic foot per storage space or so much per square foot of floor space? (Give schedule of charges if available).....
6. Are the charges based upon the relation between the cost of the warehouses and property, the annual amount necessary to pay interest and amortize bonds issued for their construction?.....
7. How many large private terminal warehouses are there?.....
8. What arrangements exist in the matter of charges and terms of occupancy for the use of unimproved upland space for storage of building materials and coarse freight or as sites for special plants?.....

VIII. IMPROVEMENTS.

1. What important improvements are contemplated, under way, or authorized?.....
2. Please indicate in a general statement the type of construction, whether pile piers, cribwork, concrete walls; whether steel or wood sheds, etc., and what type of development is followed; whether piers, or levees, or quays along the water front or lock basin.....
3. What appropriations are now available for improvements?.....
4. Do the laws and enabling acts permit the acquisition, construction, and operation directly by public authorities of terminal facilities, such as warehouses, railroads, stevedoring, and mechanical appliances?.....
5. What are the regulations governing improvements?.....
6. Do plans have to be advertised or public hearings held?.....
7. What are the powers of the port authorities to acquire property and erect thereon water-front terminal facilities, piers, tracks, warehouses, etc.?.....
8. Are the harbor authorities empowered to acquire property by means other than the usual local condemnation law? If so, explain.....
9. What control have the harbor authorities over private improvements and private water-front property and plans therefor?.....
10. Are the port and other local public authorities taking steps to attract factories or individual plants by offering sites acquired by making new land or reclaiming the water front?.....

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IX. EXPENDITURES FOR IMPROVEMENTS AND MAINTENANCE.

1. What steps are necessary to secure appropriations for improvements and maintenance?
2. Are the appropriations made out of the general city funds, the earnings of the harbor administration, or out of the State funds?
3. Are the earnings of the harbor administration turned into the city or State treasury, or are these revenues at the disposal of the harbor administration? If the latter, what are the limits placed upon the power of expenditure by the harbor authorities?
4. Give copies of laws and regulations governing appropriations, limiting the amount of funds that may be borrowed for harbor purposes, governing improvements, etc.

X. REPORTS.

1. Please furnish a copy of the last financial statement of receipts, expenditures, etc. If such annual statements are not published, it is desirable that one be made up specially for this inquiry.
2. Please furnish copies of any printed reports or other statements showing the nature and extent of the operations of the port, the character of improvements made, and any other information which may be of interest in connection with this inquiry.

## Appendix B.—REPORT ON DEVELOPMENT OF OUTER HARBOR AT CLEVELAND.[a]

TO THE BOARD OF DIRECTORS OF THE CLEVELAND CHAMBER OF COMMERCE:

As a result of the hearing before United States Engineer Col. John Millis on March 1 (which was the subject of our report to your board presented February 29), it was decided to defer action upon the application of the Otis Steel Co. for three or four weeks, to give further time for investigation of the legal questions involved. The suggestion of the amount of time for the delay was made by Mayor Baker, who expected within that time an opinion from the attorney general of Ohio on the question of the ownership of an island in the harbor area, should such an island be constructed.

The length of time is not, of course, sufficient to obtain the determination by the courts of the legal questions involved, as was suggested in our last report. Your river and harbor committee feels that some concrete suggestion of a method of handling the difficulties of the situation ought therefore to be presented at once, based in part upon a reasonable assumption of the probable legal status of the matter.

In the first place, we believe the chamber should now urge, even more specifically than it has already, that every owner of shore frontage who desires to make and use land for purposes fundamentally related to navigation should be allowed to do so, with as little restriction as is consistent with the public interest in the development of our harbor.

The only essential purpose of public control of made lands, as we view it, is to provide for the consistent development of the harbor area for purposes related to navigation and to guard against its haphazard development for other purposes entirely unrelated to navigation.

It seems to be undisputed that the State has the ownership in fee of lands now submerged, that ownership being held by the State, however, in the capacity of trustee for the public. Assuming this to be a fact, we believe and hope that it is possible for the proper representatives of the public to reach an agreement with property owners which will conserve the interests of all concerned and obviate the necessity for any channel operating an island from the mainland.

As we view the problem, the two essential principles to be conserved are these:

1. That the shore owner shall be allowed to exercise his presumed riparian rights (that is the right to reach to navigable water) only for purposes which require navigable water. He should not be tacitly permitted to make land and occupy it for purposes having no relation to navigation, nor to hold his presumed riparian rights without exercising them otherwise than to prevent the public from using its now submerged lands for any comprehensive scheme of harbor development.

2. That there should be reserved the possibility of intercommunication along the lake front. A highway and possibly a belt line are not only important to the development of the harbor, but would also very greatly benefit each shore owner who desires to use his frontage for purposes related to navigation.

[a] Made Apr. 3, 1912, by the river and harbor committee of the Cleveland Chamber of Commerce.

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It seems to us that an ideal arrangement can easily be reached by an agreement of the property owners with the proper public authorities, the terms of which might be approximately as follows:

1. That an easement or right of way of suitable width, running approximately parallel to the shore line, shall be reserved to the State or city in perpetuity; to be used by the abutting property owners, however, upon sufferance, under proper restrictions, until required for highway or railroad purposes.

2. That the State (and the city, if it claims any rights or title) will quitclaim to each private owner of lake frontage all title or rights in the submerged land, or land hereafter made by fills, from the present shore line out to the southerly line of such right of way. This would give each owner in fee a considerable tract in front of his present property, running north to the right of way.

3. That the property owners will quitclaim to the State any claimed title (including riparian rights) to made land beyond the northerly line of such right of way.

4. That the State or city will recognize a prior right of each shore owner to make and occupy, under some form of a long term and renewable lease at nominal rental, land in front of his property, extending from the northerly line of the proposed highway to the outer harbor line which will be established; such submerged or made land to be subject to lease to other parties, however, unless agreed to be actually used within a proper period for purposes having a real and fundamental relation to navigation. The city has agreed to lease the East Ninth Street piers to the passenger boat lines for a rental which is to be commuted into the improvements constructed by the boat companies. The rental of submerged lands might be similarly commuted into the land made by filling by the shore owners and lessees, which could revert to the city upon the termination of the lease. It might be advisable to add a small annual sum to be paid in cash, sufficient in the aggregate to care for the expenses of such administration as is hereinafter suggested.

5. That any contract or lease entered into between the State or city and any property owner for the use of submerged or made lands should be revocable in case such land were diverted to any uses not fundamentally related to navigation or withheld from use.

6. As supplementary to this agreement, we believe that steps should at once be taken to provide for the exercise of the rights of the public through a special department of harbor administration, the details of which could be worked out later. We believe, however, that there should be a harbor commission or commissioner, charged with the duty of supervising the development of the harbor and public harbor works as well as safeguarding the public's interests and encouraging the proper development of the port.

Such an agreement might be made at this time by the proper public authorities and the 15 private owners of frontage on the lake within the eastern extension of the breakwater, jointly or severally. The opinions rendered by the attorney general of Ohio, the city solicitor of Cleveland, and the counsel of this chamber, being substantially in agreement upon the point of ownership of submerged lands, indicate clearly that owners of shore frontage would not be likely to obtain by contests in the courts as favorable an arrangement as we here propose. The island plan, for example, would be very much more detrimental to any plans contemplated by shore owners for the development of their harbor frontage. The solution herein proposed should be acceptable to every owner of lake-front property unless he has some definite intention to use his riparian rights for private purposes either hostile to navigation or having no relation to navigation. Any owner who has such intention has no fundamental rights in the premises, since the riparian right which he presumably purchased with his land was merely the right to reach navigable water, and that presupposes the use of navigable water for the purposes of navigation. It is within the power of the Government now to establish a harbor line which would correspond with the present shore line, and debar every such owner from the privilege of making any additional land. At the time when it was proposed to construct the easterly extension of the breakwater on a line some 900 feet nearer the shore than the present breakwater, the ownership of the protected frontage was practically the same as it is to-day. None of these owners at that time had any reason to expect the right to make as much land as would now reach to the proposed harbor line, 2,000 feet inside the breakwater. Any rights that they may have to reach out to a future harbor line are rights created by the public for the purposes of navigation, and ought not to be subject to appropriation for other purposes.

If each of these 15 property owners, or a very considerable proportion of them, can and will make at this time a binding agreement such as outlined above, with the proper authorities, your committee believes the chamber of commerce should favor allowing the Otis Steel Co. to proceed with its fill, in so far as the United States has

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authority to give the company such permission. We would even recommend in such case that the United States War Department be urgently requested to establish at once the harbor line not less than 2,000 feet inside the breakwater, as desired by many of the property owners.

Your committee has been giving a large amount of time and thought to this problem, actuated purely by a desire to aid the development of industry and commerce through our harbor. Officials of the United States, the State, and the city are thoroughly awake to the importance of the problem and are devoting to the questions involved their best powers. The only thing now lacking to insure a solution not only satisfactory to the public but also helpful to the proper interests of the Otis Steel Co. and other shore owners is the hearty cooperation of these private owners of shore frontage.

We recommend that a copy of this report be sent to each one of the property owners and the State and city authorities, with a view to determining whether or not such an agreement can be reached.

## Appendix C.—LAW CREATING BOARD OF PORT COMMISSIONERS AT TAMPA.[a]

An Act Authorizing and empowering the city of Tampa to acquire, own, construct, equip, control, and lease docks and terminals, including railroads; to acquire, hold, and regulate property and franchises for such purposes and kindred and subsidiary purposes; to open, establish, and extend, by condemnation or otherwise, any street, alley, or highway over or across any railroad track, right of way, or land of any railroad company, or any other person, firm, or corporation; to widen, extend, or deepen any of the waters, including rivers, within the limits of the city of Tampa; to create a board of port commissioners for said city of Tampa, and prescribing the duties and powers thereof; and to authorize the city of Tampa to levy and collect a special tax to pay the expenses of the officers herein created, and the construction and maintenance of docks and terminals, and other improvements herein provided for, and to carry into effect the provisions of this act.

*Be it enacted by the Legislature of the State of Florida:*

SECTION 1. There is hereby created and established in and for the city of Tampa, a municipal corporation existing under the laws of the State of Florida, in the county of Hillsborough, a board of port commissioners which shall consist of seven members, and the first board shall, upon the passage and approval of this act, consist of the following persons residing in the city of Tampa, Fla., to wit: M. W. Carruth, F. C. Bowyer, J. A. Griffin, T. C. Taliaferro, W. H. Beckwith, A. W. Cuscaden, and Philip Shore.

The port commissioners herein named shall hold office until their successors are chosen at the general election of the city of Tampa to be held in the year 1916, when members of said board shall be chosen for the next succeeding four years thereafter; and thereafter the members of the said board shall be chosen at each and every succeeding period of four years.

Said port commissioners shall be resident freeholders and qualified voters of said city of Tampa. At the time of the holding of an election for the choice of said board the city council of the city of Tampa shall cause to be printed upon the ballots the names of any qualified persons who have been requested to be a candidate for the office of port commissioner by a written petition signed by at least 25 electors who are qualified to vote in an election for said port commissioners, or certified by a political party having not less than 300 electors as members thereof who are qualified to vote in an election for said port commissioners, provided said petition or certificate has been filed with the city clerk of said city not more than 60 days, nor less than 20 days, previous to the time for holding the election; and whether there be any names printed on said ballots or not, there shall be printed under the name of the office of port commissioners lines in number equal to the number of port commissioners to be elected under this act. In case of a tie vote for candidates the election shall be decided by lot. The unexpired term of any member occurring by reason of vacancy through death, resignation, removal, or other cause shall be filled by the remaining port commissioners.

Said port commissioners shall be subject to removal from office, after public trial, for malfeasance or misfeasance in office, or for the commission of any felony, or for drunkenness, by the affirmative vote of two-thirds of the members of the city council of the said city, concurred in by the mayor of said city.

Within 10 days after the passage and approval of this act by the governor, or its taking effect without the approval of the governor, the persons herein named shall file with the city clerk of the city of Tampa a written notice of their acceptance of the office herein provided for; and upon the filing of said notice of acceptance the

[a] Chap. 6782 (No. 362) of Laws of Florida, 1913.

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said board shall immediately organize and enter upon and assume its powers and duties herein provided for; and if any member of said board shall fail within the period herein prescribed to accept the said office of port commissioner, the remaining members shall elect some fit, suitable, and qualified person in the place of the member or members so failing to qualify: *Provided, however*, That if more than two of the persons herein named as the first board shall fail to qualify as herein provided for, then the offices of the members so failing to qualify shall be deemed to be vacant and unfilled, and it shall be the duty of the mayor of the city of Tampa to call a special election within 30 days to fill such vacancies, and at such election only those entitled to vote at a bonding election in said city shall be entitled to participate in said election.

In any election for the choice of the members of the said board of port commissioners only those electors of the city of Tampa who are qualified to vote in a bonding election in said city under the existing provisions of law shall be qualified to participate and vote in such election.

The said board shall, upon its organization, select one member thereof as president of said board, and some other member as secretary of said board; the said board shall have the power to adopt all necessary rules to govern the procedure and holding of the meetings of said board, including the right to adopt and have a common seal. No official action shall be taken except by a majority vote of the member of the said board; and such vote shall be a matter of record. A majority of the members of said board shall constitute a quorum, but the concurrence of at least four members of said board shall be essential to the validity of any order of said board; and said board shall keep and preserve full minutes of every meeting of said board, which shall be open to inspection as provided by law.

SEC. 2. Each member of the board of port commissioners shall receive an annual salary of $100 per year. The salaries and compensation of all employees of said board shall be fixed by said board.

SEC. 3. Meetings of said board of port commissioners shall be held at such regular periods as may be prescribed by the rules and regulations of the said board. No expenditure in the purchase of any real property, or interest therein, exceeding $1,000 and not more than $5,000 shall be made, or liability therefor incurred, without the consent of five members of said board; nor more than $5,000 and not exceeding $15,000 for the purposes aforesaid without either the unanimous consent of said board or the consent of a majority of said board ratified by an election as hereinafter next provided for. If the said board shall desire to make an expenditure or incur a liability in excess of $15,000 for the purchase of real estate, or any interest therein, the same shall not be done except the same be ratified at an election of the voters of said city in which only the voters entitled to vote at a bonding election in said city shall be qualified to vote, by a majority of the voters participating in said election.

SEC. 4. The said board of port commissioners shall have the power and authority to execute and perform each, every, and all of the matters and things hereinafter provided for: *Provided*, That the said board shall not have the power to execute any lease of any docks, terminals, or real estate committed to its charge under this act for a term exceeding six years without the same be first ratified at an election of the qualified voters of said city entitled to vote for members of the said board of port commissioners as herein provided for, by a majority of those participating in the said election.

SEC. 5. In case it shall at any time be determined by the said board of port commissioners that it is advantageous for said city, in order to pay for the construction of municipal docks and terminals, to acquire or construct any railroad or lines of railroad in said city, or to purchase any real estate or any interest therein, or to otherwise carry into effect the powers herein vested in said board of port commissioners, that there shall be a bond issue by said city, the said board of port commissioners shall by resolution determine the amount of said proposed bond issue and the purposes for which the same shall be used, and furnish a certified copy of said resolution to the City Council of the City of Tampa, and thereupon it shall be the duty of the said city council to call an election in said city to determine whether or not the bond issue shall be authorized according to the provisions of law now governing the holding and conducting of bond elections in the city of Tampa. If it shall be determined at any election so held that the said bonds shall be so issued, the proceeds derived from the sale of such bonds shall be used exclusively for the purposes for which such issue was authorized.

SEC. 6. The City Council of the City of Tampa are hereby invested with full power and authority to enact any and all ordinances that may be necessary to carry into effect the purposes and objects of this act in any respect wherein the same may be

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necessary to carry out the same relative to advertising for bids and letting to the lowest responsible bidder.

SEC. 7. All provisions of law now governing the making and letting of all contracts by the Board of Commissioners of Public Works of the City of Tampa shall apply to the making and letting of all contracts for the construction of municipal docks, terminals, and other improvements herein authorized by the said board of port commissioners.

SEC. 8. The city of Tampa is hereby fully authorized and empowered, by condemnation or otherwise, to acquire, own, or use, in the manner hereinafter provided, municipal docks and terminals, including railroads, within or adjacent to the limits of the said city deemed suitable to meet the present and future needs of the city, and to promote the growth and development of said city and the welfare of its citizens; and the said city is hereby fully authorized and empowered to provide for the improvement, maintenance, operation, and management of all such docks and terminals, including railroads, and to do any and all things within and outside said city limits reasonably necessary and advantageous to be done in connection with the acquiring, improving, maintaining, operating, and management of such docks and terminals, including railroads, looking to the meeting of the needs of commerce of the city and the development of the city and welfare of its citizens, and for these purposes is hereby specifically granted all powers of eminent domain. The decision by a majority of the members of said board of port commissioners, or the members of any municipal board which may hereafter be charged by statute with the control and management of said docks and terminals, or the performance of any other duties herein provided for, entered on the record of the minutes of the meetings of said board, shall constitute prima facie evidence of the reasonable necessity for validity and advantage of the doings of anything herein authorized to be done; and all of the powers invested in this section or otherwise in this act shall be and are hereby vested in the said board of port commissioners herein provided for.

SEC. 9. The port commissioners are hereby vested and clothed with full power and authority to carry into effect and execution each and all the objects, and to do each and all the things provided for or contemplated in this act, and to have and exercise each, every, and all power to do any and all things which they may deem desirable, convenient, or proper to further and accomplish the objects of this act or any of them, and shall have exclusive power and control over any and all docks, wharves, slips, and dock property owned, controlled, or regulated by the city of Tampa, including lands adjacent to the harbor of Tampa of which the city of Tampa has control or regulation.

The port commissioners shall also have the following duties, powers, and authority:

(*a*) To pay all expenses for investigations, maps, and plans.

(*b*) The acquisition by and in the name of the city of Tampa, from time to time, by gift, purchase, lease, condemnation, or any other method of acquisition of any land or property whatsoever, including railways and terminals already existing, interests, franchises, easements, rights, and privileges of any kind, either within or without the limits of the city of Tampa, Fla., which may be proper or desirable for the purpose of this act.

(*c*) The acquisition, construction, establishment, equipment, maintenance, and operation of public wharves, piers, docks, warehouses, railroad tracks, rolling stock, and all other buildings or things, either within or without the limits of the city of Tampa, Fla., as may be proper or desirable in connection with the objects of this act, with alterations, additions, extension, or changes of such docks, buildings, and other property.

(*d*) The widening, extending, or deepening of any waters, including rivers, within the city limits, and the cleaning, scouring, dredging, or ballasting of the same or the approaches thereto, necessary to the purposes of this act.

(*e*) The doing of any and all other acts necessary or convenient in connection with the purpose of this act.

(*f*) Amounts which shall be derived from the use and occupation of said property, including such amounts as may be derived from leases thereof, shall be used for the maintenance, operation, and improvement of said docks and terminals, and shall be deposited in the city treasury, and kept by the city treasurer in a separate account to be drawn out for the purposes contemplated in this act upon warrants duly drawn and approved by the board of port commissioners, and countersigned by the city auditor.

SEC. 10. The port commissioners are hereby vested and clothed with full power and authority to carry into effect and execution each and all of the objects, and to do each and all of the things provided for or contemplated by this act, and to have and exercise each, every, and all powers to do any and all things which they may

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deem desirable, convenient, or proper to further and accomplish the objects of this act or any of them.

SEC. 11. The port commissioners shall have the power to execute leases and agreements for the use and occupation of the property under their control, and also to fix rents, rates, charges, rules, and regulations for the use thereof, all of which shall be just, reasonable, equitable, and without discrimination. No lease shall at any time be made of the whole of such property, or any of such parts thereof, as will interfere with the furnishing by the port commissioners of ample dock and terminal facilities as municipal docks and terminals open to all on reasonable terms.

SEC. 12. No port commissioner shall be or become pecuniarily interested in any contract let or concerning any work done in the furtherance of the object of this act; any violation of this section shall be ground for removal from office, and also for the cancellation of any such contract.

SEC. 13. Said port commissioners shall have the power, and it shall be their duty, at their discretion, to inspect all books and accounts of the officers, agents, and employees of the city of Tampa, charged in any manner with the enforcement of any of the provisions of this act, and to require reports from them and to enforce proper performance by said officers, agents, and employees of their duties, so far as they relate in any manner to the faithful, just, and proper administration of the funds collected or received by them for the purposes mentioned in this act. The mayor shall have the right at any time to investigate and to have investigated fully the doings of the port commissioners, and to at any time require reports from them concerning their actings and doings.

SEC. 14. It shall be the duty of the port commissioners on or before the 1st day of July of each and every year to report to the city council the amount of money necessary to be raised for the proper maintenance of said docks and terminal, which statement and estimate shall serve as a basis of assessment by the city council for the ensuing year.

SEC. 15. The city council shall levy annually a special tax of not less than 1 nor more than 4 mills on the taxable property within the corporate limits of said city, as may be necessary, together with the net proceeds of the properties controlled by the port commissioners, or their successors, to pay the expenses of said port commissioners and the proper maintenance of said docks and terminals.

The moneys received from said special tax shall be deposited with the city treasurer, and kept by him in a separate account to be drawn upon warrants approved by the port commissioners and countersigned by the city auditor.

SEC. 16. The said board of port commissioners is hereby given power, by condemnation or otherwise, to establish, open, or extend any street, alley, or highway over or across any railroad track, right of way, or lines of any railroad company, or of any person, firm, or corporation within the corporate limits of said city, or outside of said city, as may be necessary to carry into effect the purposes of this act.

SEC. 17. The board of port commissioners hereby created shall have full power and authority in the matter of the disbursement of all moneys now belonging to the city of Tampa, or that may hereafter belong to the city of Tampa, providing for the construction of docks within said city. Any such moneys shall remain in the custody of the city treasurer subject to being paid out by warrants drawn and issued by the said board of port commissioners according to the terms and provisions of this act.

SEC. 18. Each member of the board of port commissioners shall, before assuming the duties of his office, take and subscribe to an oath to well and faithfully perform the duties of said office in accordance with the provisions of this act, and shall enter into and file with the city treasurer a surety bond payable to the city treasurer conditioned for the faithful performance of his duties in the sum of $10,000, the premium on which bond shall be paid by said city of Tampa.

SEC. 19. It shall be unlawful for the said board of port commissioners at any time to incur any indebtedness or liability for the payment of any money when the funds to pay the same are not to the credit of the said board and in the hands of the city treasurer.

SEC. 20. The said board of port commissioners shall have, and the same is hereby granted, full power and authority to bring any and all suits and actions in the name of the city of Tampa that may be necessary for said board to carry out, execute, and perform any and all the power and authority herein and hereby granted to and vested in said board; and said board may employ special counsel to advise and represent the said board when it shall deem the same necessary and expedient.

SEC. 21. Full jurisdiction and control is hereby granted and vested in the said board of port commissioners over any and all wharfs, docks, lands, and waters in and adjacent to the city of Tampa to the extent that the same is necessary or proper to carry out and accomplish the objects and purposes of this act; and the said board of

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port commissioners is hereby granted power and authority to make, publis gate, and enforce by action at law or suit in equity, or other appropriat any rules or orders made by said board within the jurisdiction and pov granted or intended to be granted to said board.

SEC. 22. All laws and parts of laws in conflict with this act be and the hereby repealed.

SEC. 23. This act shall take effect immediately upon its passage and ap the governor, or its becoming a law without such approval.

Approved, June 7, 1913.

## Appendix D.—AMOUNTS EXPENDED FROM FEDERAL APPROPRIATIONS FOR CERTAIN HARBORS.

| Localities. | Amount expended to June 30, 1915. | Balance unexpended on June 30, 1915. |
|---|---|---|
| ATLANTIC COAST. | | |
| Portland, Me | $1,811,030.30 | $171,706.19 |
| Boston, Mass | 12,010,201.24 | 461,268.71 |
| New Bedford and Fairhaven Harbors, Mass. | 696,801.52 | 57,729.91 |
| Fall River, Mass | 365,978.17 | 15,131.82 |
| Providence River and Harbor, R. I | 2,825,202.54 | 441,191.56 |
| New London, Conn | 173,462.96 | 1,739.04 |
| New Haven, Conn.: | | |
| Dredging | 921,561.36 | 89,879.95 |
| Breakwaters, harbor of refuge | 1,267,244.31 | |
| Total | 2,188,805.67 | 89,879.95 |
| Bridgeport, Conn | 974,254.66 | 13,117.06 |
| Hartford, Conn.[a] | 848,905.47 | 55,136.18 |
| New York, N. Y.: | | |
| East River and Hell Gate | 6,104,732.48 | 173,322.36 |
| Hudson River Channel | 342,904.99 | 298,621.49 |
| Gedney and Main Ship Channels | 2,646,964.80 | 78,273.59 |
| Coney Island Channel | 112,328.43 | 2,008.57 |
| Ambrose Channel | 5,348,489.04 | |
| Bay Ridge and Red Hook Channels | 4,227,656.16 | 199,642.75 |
| Total | 18,783,075.90 | 751,868.76 |
| Philadelphia, Pa., Delaware River at and below Philadelphia | 19,185,496.62 | 2,031,191.56 |
| Wilmington, Del | 1,482,124.44 | 116,771.63 |
| Baltimore, Md.: | | |
| Channel to Baltimore in Patapsco River and at York Spit | 8,461,763.91 | 85,957.24 |
| Curtis Bay Channel | 255,060.00 | 5,000.00 |
| Southwest Baltimore | 381,276.77 | 10,223.23 |
| Total | 9,098,040.68 | 101,180.47 |
| Washington, D. C.[b] | 4,257,557.13 | 104,185.90 |
| Norfolk, Va.: | | |
| General improvement, including main channel of Elizabeth River and portions of the Southern, Eastern, and Western Branches | 3,547,803.76 | 38,406.20 |
| Channels to Newport News | $709,289.34 | $18,210.66 |
| Thimble Shoal Channel | 334,023.38 | 15,976.62 |
| Total | 4,591,116.48 | 72,593.48 |
| Cape Charles, Va | 144,918.84 | 331.16 |
| Richmond, Va. (James River) | 3,199,092.06 | 51,773.19 |
| Wilmington, N. C. (Cape Fear River at, and below) | 5,974,868.48 | 171,300.44 |
| Charleston, S. C | 5,149,995.64 | 21,041.59 |
| Savannah, Ga | 10,241,200.85 | 344,525.85 |
| Brunswick, Ga | 1,398,441.36 | 39,880.64 |
| Jacksonville, Fla.: | | |
| St. Johns River opposite Jacksonville | 486,500.00 | |
| St. Johns River below Jacksonville | 6,368,307.86 | 459,561.70 |
| Total | 6,854,807.86 | 459,561.70 |
| GULF OF MEXICO. | | |
| Tampa, Fla.: | | |
| Hillsboro Bay | 1,869,630.08 | 342,265.96 |
| Hillsboro River | 17,393.03 | 1,106.97 |
| Total | 1,887,023.11 | 343,372.93 |
| Pensacola, Fla | 1,356,818.15 | 25,371.33 |
| Mobile, Ala.[c] | 7,564,101.53 | 106,929.33 |
| New Orleans, La.: | | |
| Southwest Pass, Mississippi River | 9,489,931.35 | 590,468.13 |
| South Pass, Mississippi River, improvement | 9,739,341.38 | 90,663.10 |
| South Pass, Mississippi River, examinations and surveys | 406,503.17 | 785.00 |
| Total | 19,635,775.90 | 681,916.23 |
| Galveston, Tex.: | | |
| Entrance Channel | 11,392,040.40 | 57,959.97 |
| Inner Channel | 1,685,990.36 | 137,075.07 |
| Total | 13,078,030.76 | 195,035.04 |
| Houston, Tex | 4,669,593.14 | 369,946.28 |

[a] Connecticut River below Hartford.
[b] Including Potomac and Anacostia Rivers at Washington, D. C.
[c] Including expenditures for improvement of Mobile Bar, Ala.

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*Appendix D.—Amounts expended from Federal appropriations for certain harbors*—Con.

| Localities. | Amount expended to June 30, 1915. | Balance unexpended on June 30, 1915. |
|---|---|---|
| GULF OF MEXICO—con. | | |
| Port Arthur and Sabine Pass, Tex.:[a] | | |
| Harbor at Sabine Pass and Port Arthur Canal | $5,514,307.15 | $288,517.37 |
| Operating and care of Port Arthur Canal | 395,290.52 | ..... |
| Total | 5,909,597.67 | 288,517.37 |
| Texas City-Galveston Harbor Channel | 1,456,361.33 | 628,648.97 |
| PACIFIC COAST. | | |
| San Diego, Cal. | 1,017,788.81 | 66,347.19 |
| Los Angeles, Cal.: | | |
| Outer Harbor | 3,376,039.06 | 10,233.49 |
| Inner Harbor | 2,476,052.62 | 95,143.88 |
| Total | 5,852,091.68 | 105,377.37 |
| San Luis Obispo, Cal. | 568,418.08 | 242.87 |
| San Francisco, Cal. | 571,052.19 | 63,405.33 |
| Oakland, Cal. | 4,238,832.49 | 178,235.86 |
| Sacramento, Cal.:[b] Sacramento River up to Red Bluff and Feather River up to Marysville | 1,137,532.69 | 56,409.38 |
| Stockton, Cal.: | | |
| San Joaquin River including Stockton and Mormon Channels (maintenance) | 690,579.55 | 190,283.70 |
| Stockton and Mormon Channels diverting canal | 246,502.67 | 34,900.66 |
| Total | 937,082.22 | 225,134.36 |
| Portland, Oreg.: | | |
| Mouth of Columbia River | 13,156,162.52 | 1,491,703.47 |
| Columbia and lower Willamette Rivers below Portland | 3,577,958.35 | 457,985.50 |
| Total | 16,734,120.87 | 1,949,688.97 |
| Tacoma, Wash. | 324,784.10 | 15,216.30 |
| Seattle, Wash., waterway connecting Puget Sound with Lakes Union and Washington | 2,234,874.97 | 553,135.08 |
| GREAT LAKES. | | |
| Duluth-Superior Harbor, Minn. and Wis. | $7,524,816.78 | $187,289.53 |
| Two Harbors (Agate Bay), Minn. | 262,356.30 | 3,430.39 |
| Ashland, Wis. | 600,674.42 | 33,825.58 |
| Marquette, Mich. | 854,935.60 | 357,128.29 |
| Manitowoc, Wis. | 912,520.64 | 4,292.08 |
| Milwaukee, Wis.: | | |
| Entrance, including harbor of refuge | 2,375,049.39 | 16,854.34 |
| Inner harbor | 5,000.00 | 34,000.00 |
| Total | 2,380,049.39 | 50,854.34 |
| Chicago, Ill.: | | |
| Harbor | 2,892,136.84 | 827,711.73 |
| River | 1,701,607.53 | 70,672.13 |
| Total | 4,593,744.37 | 898,383.86 |
| South Chicago: | | |
| Calumet Harbor | 1,595,144.57 | 20,087.43 |
| Calumet River | 1,253,643.28 | 70,641.36 |
| Total | 2,848,787.85 | 90,728.79 |
| Grand Haven, Mich. | 1,049,479.91 | 50,463.16 |
| Ludington, Mich. | 1,593,485.77 | 11,522.04 |
| Detroit, Mich.[c] | ..... | ..... |
| Toledo, Ohio | 3,089,011.72 | 126,863.74 |
| Sandusky, Ohio | 1,286,276.92 | 16,192.98 |
| Huron, Ohio | 573,883.62 | 3,000.00 |
| Lorain, Ohio | 1,144,160.88 | 39,224.31 |
| Cleveland, Ohio | 7,503,270.45 | 348,009.35 |
| Fairport, Ohio | 1,113,965.48 | 20,020.19 |
| Ashtabula, Ohio | 2,271,919.56 | 35,515.11 |
| Conneaut, Ohio | 1,447,050.57 | 489,739.89 |
| Erie, Pa. | 1,502,113.36 | 40,514.11 |
| Buffalo, N. Y.: | | |
| Outer and inner harbors | 6,145,010.05 | 429,205.20 |
| Lake Erie entrance to Black Rock Harbor and Erie Basin | 824,643.00 | 10,000.00 |
| Black Rock Harbor and Channel | 3,900,365.89 | 159,045.07 |
| Operating and care of Black Rock Canal, Lock, and Ferry Street Bridge | 32,775.58 | ..... |
| Total | 10,902,794.52 | 598,250.27 |
| Tonawanda Harbor and Niagara River | 661,323.23 | 272.45 |
| Charlotte, N. Y. | 904,722.92 | 19,292.54 |
| Ogdensburg, N. Y. | 530,412.58 | 9,479.54 |

[a] The Port Arthur Canal was constructed by private interests and conveyed to the United States free of cost, and the figures given cover the cost of operation and care of the canal since Dec. 13, 1906, and of some work of improvement since July 25, 1912. They do not cover the cost of original construction of the canal.

[b] There has been no specific improvement of Sacramento Harbor, the port deriving benefit from the general improvement of the Sacramento River, which has been combined with the improvement of the Feather River.

[c] There has been no specific improvement of Detroit Harbor, the port deriving benefit from the improvement of the river, in common with other lake ports.

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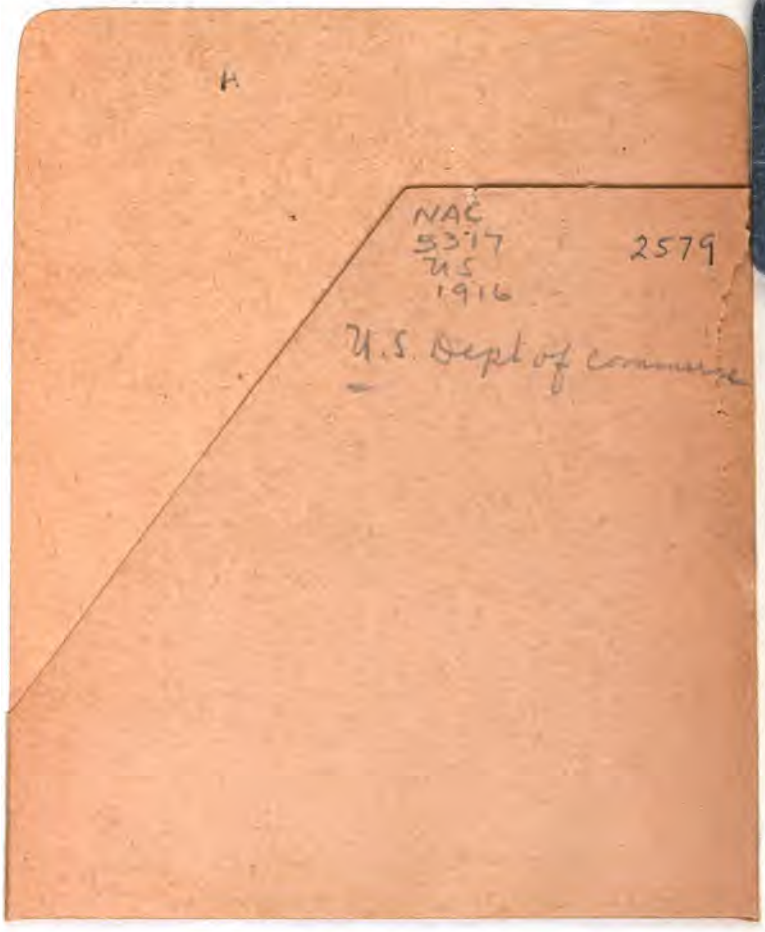


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